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THE AMERICAN ARCHITECT AND BUILDING NEWS

A WEEKLY JOURNAL OF CONSTRUCTIVE AND DECORATIVE ART.

VOL. XVI.—No. 460.] SATURDAY, OCTOBER 18, 1884. [PRICE, 15 CENTS.

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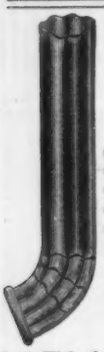

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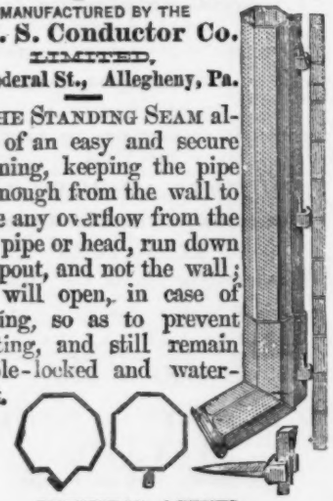

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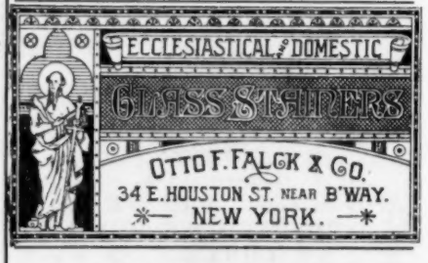

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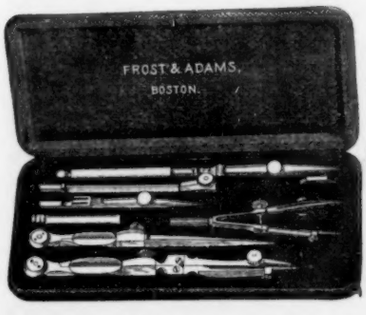

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Friezes, Panels, Mantel-Facings, Bas-Reliefs, &c., from Original Designs or those furnished, for the interior Decoration of Dwelling-Houses, Public Buildings, Hotels, Elevator-Cabs, Parlor and Passenger Cars, Steamers, &c., in Copper, Brass, Bronze, and Silver, reproducing with exact fidelity natural objects or other models.

Special attention is called to the reproductions from natural leaves and flowers in the panels and tiles for furniture and interiors.

☞ Correspondence solicited and estimates furnished on application.

42 Batterymarch Street, Boston.

E. V. R. THAYER, President. S. L. HOLDREGE, Treasurer.

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ARCHITECTURAL FINISH, AND OIL SHELLAC.
For Sale in Boston by WADSWORTH, HOWLAND & CO.
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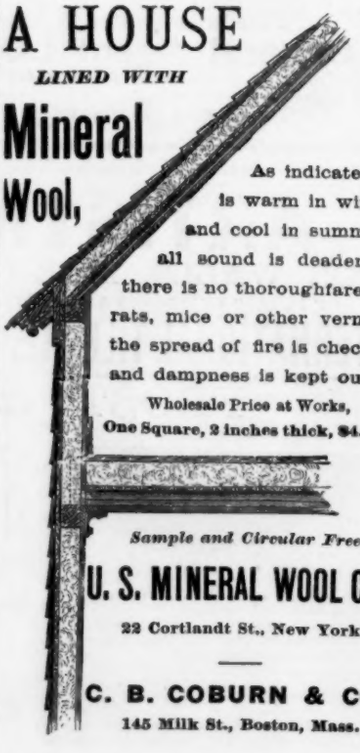
Draughtsmen's Supplies.
Blue-Print Papers, Drawing Papers, Mathematical Instruments, Drawing Inks, Architectural and Fresco Designs.
Artists Materials Generally.
1125 CHESTNUT STREET, PHILADELPHIA, PA.

A HOUSE
LINED WITH
Mineral Wool,



As indicated, is warm in winter and cool in summer; all sound is deadened; there is no thoroughfare for rats, mice or other vermin; the spread of fire is checked and dampness is kept out.

Wholesale Price at Works,
One Square, 2 inches thick, $4.00.

Sample and Circular Free.

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145 Milk St., Boston, Mass.

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Z. WILE,
PASSENGER AND FREIGHT ELEVATORS,
Hand-Hoists, etc., of the latest improved inventions now manufactured. Invalid Elevators a specialty.
Office, 191 Tremont Street, Boston.

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MACHINE AND ELEVATOR WORKS,
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HYDRAULIC STEAM AND BELT ELEVATORS.
Hand-Hoists operated with ropes or cranks. Automatic Hatch-doors. Governors, and Safety-catches.
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Works, 1763 Barker Street, Philadelphia, Pa
New York Office, 12 Cortlandt Street.

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Steam, Belt, and Hand-Power
Passenger & Freight Elevators.
Automatic Hatch-Doors. Also, Invalid Safety-Elevators, and Dumb Waiters for Hotels and Residences. Send for Illustrated Circular.
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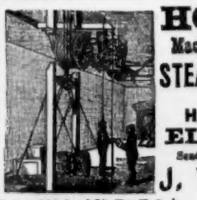
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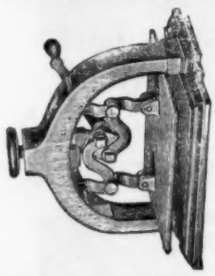
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ESPECIALLY ADAPTED TO
Public Buildings, Private Residences, Mills, Warehouses, Stores, and all Mercantile Structures.
IT IS POSITIVELY FIRE-PROOF.
WIRE LATHING possesses the following qualities:
IT IS NOT COSTLY.
IT IS EASILY AND CHEAPLY APPLIED.
PLASTERING ON THE WIRE LATH WILL NOT CRACK.
THE LATH WILL NOT CORRODE.
The plastering, when applied, clinches on both sides of the wire, forming a double surface.
THE WIRE LATHING is extensively used by the United States Government in its Custom House Court House, and Post Office Buildings.
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Full information given on application to the
CLINTON WIRE CLOTH CO., Clinton, Mass.
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LINSEED OIL AND CHEAPER ALSO.
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White Lead and Linseed Oil.
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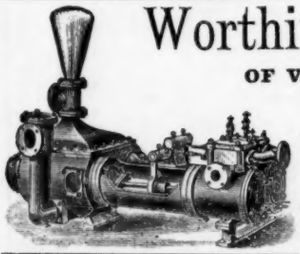
Unequalled Stock of Choice Hardware. Specifications figured and orders filled in all markets.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OF VARIOUS TYPES AND PATTERNS.
SPECIAL PATTERNS
For Railway Water Stations, House Tank Service, Hydraulic Elevators, etc.
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NEW YORK, BOSTON,
CINCINNATI, CHICAGO,
ST. LOUIS, SAN FRANCISCO

HANOVER FIRE INSURANCE CO.

Cash Capital	$1,000,000.00
Reserve for Re-insurance	635,741.16
Reserve for all other Liabilities,	96,655.57
Net Surplus	832,744.56
Total Assets, January 1, 1883	2,565,141.29

BUILDING MATERIALS.
Reported for the American Architect and Building News.

BRICK.—₱ M.	New York. (Wholesale Prices.)	Boston. (Prices to Builders and Contractors.)	Chicago. (Prices to Builders and Contractors.)	Philadelphia. (Prices to Builders and Contractors.)
Common: *Cargo afloat.*				
Pale	$2 50 @ $3 50	Eastern 7 50 @ 8 00	Building Brick 6 50 @ 7 50	Hard 8 00 @ 8 50
Jersey	4 50 @ 5 25	Bay State Hard 9 00		Salmon 5 00 @ 6 00
Up River	5 00 @ 5 75	Domestic Com. 8 00 @ 9 00	Indiana Pressd 16 00 @ 28 00	Stretchers 11 00 @ 14 00
Haverstraw Bay	5 75 @ 6 25	Domestic Face 19 00 @ 20 00	St. Louis Fronts 25 00 @ 30 00	Pressed 20 00 @ 24 00
" 1st	6 25 @ 6 50	Philadelphia 40 00 @ 45 00		
Fronts:		Phila. mould 50 00 @ 80 00		
Croton, Brown	13 @ 14 00		22 00 @ 35 00	
" dark	14 @ 15 00		65 00 @ 350 00	
" red	14 @ 15 00		50 00 @	
Chicago pressed		Glens Falls 25 00 @ 26 00		
Chicago Moulded			42 00 @	
Baltimore	37 @ 41 00		40 00 @	
Glens Falls—white	30 @ 35 00	Glens Falls Mould. 30 00 @ 35 00	25 00 @	
Philadelphia	@ 27 00	35 00 @ 40 00	60 00 @ 100 00	
Trenton	@ 27 00	45 00 @ 60 00	30 @	
Milwaukee			35 @	
Moulded:			55 00 @ 65 00	
Clark's Glens Falls—Red	25 00 @ 27 00			
" —White	30 00 @ 35 00		65 @ 75	
White " Mold,	45 00 @ 60 00		80 @ 90	
Enamelled: *Imp.*			*Not Sold.*	1 25 @ 1 65
Enamelled (edge.)	85 00 @ 100 00			
Enamelled (edge and end)	90 00 @ 115 00	@ 1 50	1 00 @ 1 25	*Not sold.*
CEMENT, LIME, etc.—(₱ *cask.*)		*Not sold.*	2 75 @ 3 00	2 30 @ 3 50
Chicago Lime in bulk		@ 3 20	2 75 @ 3 00	2 50 @ 3 00
Wisconsin "		2 50 @ 3 00	3 25 @ 3 75	3 00 @ 3 25
Rosendale Cement		3 00 @ 3 50	*Not sold.*	4 50 @
Utica, Akron, Buffalo, Louisville, Milwaukee	80 @ 1 00	*Not sold.*	3 75 @ 4 25	*Not sold.*
Portland (English)	*Not sold.*	*Not sold.*	*Not sold.*	3 00 @ 3 25
" (Saylor's Am.)	2 60 @ 3 10		3 35 @ 3 50	2 75 @ 3 00
" (Dyckerhoff)	2 05 @ 2 40		3 15 @ 3 35	
" (Lafarge)	2 75 @ 3 15		3 00 @ 3 25	
" (Star)	3 50 @ 3 75		3 15 @ 3 35	2 90 @ 3 25
K. B. & S. (Eng.) Portland	2 76 @ 3 00		*Not sold.*	
Burham " "	2 85 @ 3 10		*Not sold.*	
Vorwohler	2 60 @ 2 80		*Not sold.*	
German (Fewer)	2 65 @ 3 25		1 00 @ 1 25	
" (Alsen)	2 50 @ 2 70		*Not sold.*	
Selenitic	2 56 @ 2 80		*Not sold.*	
Hydraulic Lime of Teil			*Not sold.*	
Roman	3 50 @ 4 00		*Not sold.*	
Keene's coarse	2 75 @ 3 00		*Not sold.*	
" fine	5 00 @ 6 00		*Not sold.*	
Lime:	9 25 @ 10 25		*Not sold.*	
Rockland and Rockport, (Com.)	@ 1 00		*Not sold.*	
Rockland and Rockport, finish	@ 1 20		*Not sold.*	
State, com. cargo rates (nom.)	75 @ 80		*Not sold.*	
State, finishing	95 @ 1 10		*Not sold.*	
Plaster of Paris (calcined.)	1 30 @ 1 35		*Not sold.*	
" (casting)	1 50 @ 1 65		*Not sold.*	
Hair (Cattle) ₱ *bush.*	21 @ 23		*Not sold.*	
" (Goat)	30 @ 35		*Not sold.*	
Sand, ₱ *load*	1 00 @ 1 25		*Not sold.*	
STONE. (₱ *cubic foot, rough.*)				
Granite: (*Maine*)		@ 60		
Limestone:				
Bedford	@ 1 00	95 @ 1 00	50 @	3 75 @
Joliet	@		35 @ 55	
Lemont	@		35 @ 60	
Serpentine	@		80 @ 90	

(Continued on page vi.

10

For a Sash of 250 Lbs.

"MORTON'S METAL"

(Registered Trade-mark, May 1st, 1883.)

Cable and Champion Sash-Chains

and Patented Attachments.

The most **RELIABLE** and **CHEAPEST** article in the market for suspending

Window-Sashes.

HAS GREAT TENSILE STRENGTH,

Can be easily applied to any window, and gives SATISFACTION wherever used. Samples sent to any Architect free on application. Now in use in all the leading cities throughout the United States.

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THOMAS MORTON,

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CHAMPION CHAIN.

BUILDING MATERIALS.

	New York. (Wholesale Prices.)	Boston. (Prices to Builders and Contractors.)	Chicago. (Prices to Builders and Contractors.)	Philadelphia (Prices to Builders and Contractors.)
Foundation:				
Dimension	@	5 00 ℔ ton	20 @ 28	30 @ 5 00
Block	@	4 00 ℔ perch	8 50 ℔ cord.	50 @ 6 00
Rubble	@	1 25 @ 1 50	8 50 @	
Bluestone: (℔ *sq. ft.*)				
Sidewalk	30 @ 5 00	40 @ 1 75	75 @ 1 00	70 @ 90
Planed	50 @ 6 00	75	50 @ 1 00	1 10 @ 1 25
Sandstone,				
Longmeadow		75 @ 85		
Brown (Connecticut)	1 00 @	1 25 @ 1 45	1 50 ℔ cub.ft.	
Amherst	1 00 @	90 @ 1 00	55 @ 65	
Berea	75 @ 1 00	80 @ 90	45 @ 55	70 @ 90
Berlin	75 @ 1 00	80 @ 90	55 @ 65	
Bay of Fundy	@ 1 00	*Not sold*	*Not sold.*	
Belleville	80 @ 1 25	1 25 @ 1 35	"	
New Brunswick	@ 1 00	90 @ 1 00	"	
Caen	@	@ 2 00	"	
Marble:				
Lee, Mass	@	1 75 @ 2 50	*Not sold.*	2 00 @ 2 50
Rutland, white	@	@ 3 00	3 50 @ 5 00	2 25 @ 2 50
Sutherland Falls	1 25 @ 1 75	@ 2 00	3 50 @ 5 00	1 50 @ 2 50
Glens Falls, black	@	2 00 @ 3 00	*Not sold.*	4 00 @ 4 50
Italian, blue-veined	@	50 @ 60	@ 4 40	—— @ ——
" Sienna	@	3 00 @ 3 50	*Not sold.*	3 25 @ 6 50
Tennessee, red	@	1 25 @ 2 50	@ 4 00	2 00 @ 3 00
" Knoxville	@	85 @ 90	@ 4 00	@ 1 50
Pennsylvania, blue	@		*Not sold.*	2 23 @ 2 50
Vermont, white	@	1 50 @ 2 00	3 50 @ 5 00	
Slate:				
Roofing, (℔ *square*)	@	4 50 @ 7 00	6 25 @ 8 10	@ 7 00
" green	7 00 @ 8 00	5 50 @ 6 50	@ 8 60	@ 7 00
" purple	7 00 @ 8 50	13 00 @ 14 00	——@ 16 00	5 00 @ 5 75
" red	@ 15 00	*Not sold.*	7 20 @ 7 60	5 00 @ 5 75
" black, Lehigh	—— @ ——	*Not sold.*	7 30 @ 8 00	6 00 @ 6 25
" " Chapmans	—— @ ——		*Not sold.*	@ 15 00
Tiles, Am. ℔ M.	@			
LUMBER.—℔ M. (*Ordinary dimensions.*)				
Boards:				
Pine, 1st quality, clear	65 00 @ 75 00	50 00 @ 53 00	44 00 @ 49 00	
" 2d quality	55 00 @ 60 00	42 00 @ 44 00	40 00 @ 46 00	
" 3d quality	18 00 @ 22 00	35 00 @ 38 00	37 00 @ 44 00	
Spruce	@ 25 00	11 00 @ 12 50	*Not sold.*	
Hemlock	ea. 17 @ 18	12 00 @ 12 50	@ 10 00	11 50 @ 15 00
Yellow pine	20 @ 40	30 00 @ 33 00	@ 28 00	16 00 @ 18 50
Cypress	@	@ 35 00	@	@
Clapboards:				
Pine	@	33 00 @ 55 00	14 00 @ 22 00	—@—
Spruce	@	23 00 @ 30 00	*Not sold.*	—@—
Framing Timber:				
Pine			13 00 @ 15 50	25 00 @ 35 00
Spruce	14 00 @ 18 00	13 50 @ 14 50	*Not sold.*	18 50 @ 20 00
Hemlock	12 00 @ 15 00	@	13 00 @ 19 00	12 00 @ 13 00
Yellow pine	20 00 @ 30 00	21 00 @ 25 00		22 00 @ 24 00
Laths:				
Pine	@	2 00 @ 2 25	2 25 @	—@—
Spruce	2 25 @ 2 30	2 00 @ 2 25	*Not sold.*	2 40 @ 2 60
Shingles:				
Pine, shaved	5 00 @ 6 00	@	*Not sold.*	
Pine, sawed	4 00 @ 5 00	@ 4 50	2 25 @ 2 60	
Spruce, sawed	2 50 @ 2 75	@ 1 50	*Not sold.*	
Redwood	2 10 @	@ 3 00	5 50 @ 8 00	30" $10 @ 28
Cedar, split	@	@	*Not sold.*	24" 8 @ 21
Cedar, sawed	@	2 00 @ 3 50	@ 2 30	20" 5 50 @ 14
Cypress 7 x 24	18 00 @ 20 00	5 50 @ 6 00	*Not sold.*	16 00 @ 20 00
Miscellaneous:				
Piles ℔ ft.	4½ @ 6	Piles 6c. ℔ ft.	*Not sold.*	
Fence pickets, Spruce	8 00 @ 10 00	10 00 @ 18 00	Pine, 8 @ 22	12 00 @ 14 00
Cedar posts, 9 ft. (sq. posts)	@	25 @ 35	9 00 @ 21 00	76 @ 1 25
Chestnut "	@	25 @ 35	*Not sold.*	28 @ 36
Finishing Woods: ℔ M. (*First Quality, Kiln-dried.*)				
Ash	@ 55 00	38 00 @ 48 00	35 00 @ 40 00	
Cherry	80 00 @120 00	60 00 @ 90 00	75 00 @ 85 00	55 00 @ 65 00
Chestnut	@ 55 00	38 00 @ 50 00	45 00 @ 50 00	60 00 @ 80 00
Butternut	40 00 @ 60 00	60 00 @ 70 00	45 00 @ 60 00	55 00 @ 65 00
Mahogany, Baywood	@180 00	100 00 @ 150 00	150 00 @ 180 00	100 00 @
" St. Domingo	@350 00	180 00 @ 250 00	250 00 @ 300 00	
Maple	45 00 @ 50 00	45 00 @ 65 00	30 00 @ 35 00	30 00 @ 50 00
Oak, red	@ 70 00	@ 50 00	35 00 @ 40 00	35 00 @ 45 00
" white	@ 70 00	@ 55 00	35 00 @ 40 00	55 00 @ 65 00
" quartered	@ 90 00	65 00 @ 70 00	50 00 @ 55 00	70 00 @ 80 00
Sycamore quartered		@ 65 00		
Pine, clear	65 00 @ 70 00	30 00 @ 65 00	45 00 @ 50 00	65 00 @ 90 00
Redwood	70 00 @ 75 00	60 00 @ 70 00	60 00 @ 70 00	100 00 @
Rosewood ℔ lb	@ 6		@ 7	
Walnut, black	125 00 @150 00	85 00 @ 100 00	80 00 @ 120 00	160 00 @200 00
Whitewood	45 00 @ 50 00	38 00 @ 45 00	@ 30 00	20 00 @ 30 00
Yellow pine ℔ M	@ 45 00	40 00 @ 45 00	30 00 @ 35 00	30 00 @ 35 00
Gumwood, best red			30 00 @ 35 00	
PAINTS. (*In oil, ℔ lb.*)				
White lead, Am	6½ @ 6½	5½ @ 6½	5½ @ 5¾	4 @ 6½
" Zinc, "	5 @ 8½	8 @ 12	7 @ 11	4 @ 8
Red, Am.,	6 @ 6½	@ 12	5½ @ 6	
" Venetian	6 @ 10½	7 @ 12	1½ @ 2½	4 @ 6½
" Vermilion	55 @ 60	55 @ 60 dry	50 @ 75	Am. 12 @ 16
Red Indian, Eng	12 @ 20	14 @ 20	12 @ 20	12 @ 16
Yellow Ochre	6 @ 15	7 @ 12	3 @ 15	4 @ 9
" Chrome	12 @ 20	18 @ 25	12 @ 25	12 @ 25
Green (chrome)	8 @ 13	12 @ 20	8 @ 20	9 @ 14
Green, Paris,	16 @ 20	25 @ 40	16 @ 35	14 @ 29
Black, lamp,	8 @ 12	15 @ 25	8 @ 30	12 @ 18
Blue, ultramarine	12 @ 18	18 @ 30	10 @ 35	20 @ 35
Oil, linseed, (raw) (℔ gal.)	53 @ 54	54 @ 59	48 @ 49	54 @ 58
" " boiled	56 @ 57	57 @ 62	51 @ 53	57 @ 60
Turpentine	30 @ 31	36 @ 43	32 @ 34	38 @ 41
Varnish, coach		1 50 @ 6 00	1 25 @ 2 00	1 40 @4 00
Shellac		2 50 @ 3 00	3 25 @ 4 00	1 75 @3 00
Putty	2 @ 3	2 @ 4	02 @ 03	2 @ 2½
Whiting (℔ cwt.)	50 @ 90	1 @ 1½	1 @ 2	½ @ 7-10
Paris white, (Eng.,)	30 @ 2 00	2 @ 3	2 @ 2¾	1 30 @1 60
Litharge, Am	5½ @ 5¾	6½ @ 7	6½ @ 10	6½ @ 7
Sienna, (burnt)	12 @ 17½	14 @ 20	4 @ 16	9 @ 14
Umber, "	11 @ 16½	14 @ 20	@ 10	9 @ 14

(*Continued on page* vii.)

FOR HEAVY SASH

USE

RAYMOND'S

Compressed Lead Sash Weights.

With Wrought and Malleable-Iron fastenings.

Twice the heft of iron. Occupying only half the space.

Prices no higher than the ordinary cast lead-weights.

Freight allowed to any part of the country. Send for Circular.

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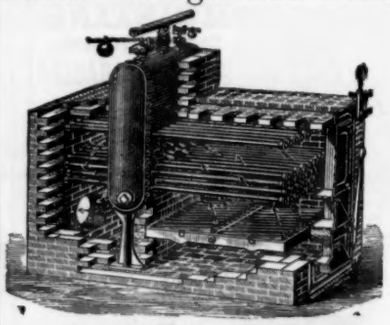
THE HOLLAND

Patent Wrought-Iron Boiler



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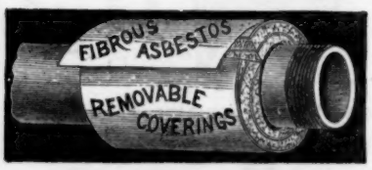
HOLLAND & THOMPSON, - - Troy, N. Y.

PIPE-COVERING.



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Asbestos Building-Felt, Fire-Proof Cements, &c.

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PETER BACKUS,

Steam Heating Apparatus,

For Public or Private Buildings.

Sole New York Depot For the Sale of the

Albany Steam Trap Co.'s Specialties.

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The most economical in use. Over 50 different kinds. Suitable for Families, Hotels, Restaurants and Public Institutions. Laundry, Hatters' and Tailors' Heaters. Hot-Plates, Warming-Closets for Pantries. Hot-Water Generators, etc., etc.

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Of the latest and most beautiful designs, and all other Slate and Soapstone work on hand or made to order. JOSEPH S. MILLER & BROTHER, 1210 Ridge Avenue, Philadelphia, Pa. Successor to Wilson & Miller. Send for Illustrated Price-List.

THE PERRET PATENT FURNACES,

For burning Coal-dust, Sawdust, &c., will save from 50 to 90 per cent in your Fuel Account. Send for descriptive Circular.

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MANUFACTURER,
2218 to 2224 Pennsylvania Ave.,
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Also builder of Elevators, Engines, &c.

Unparalleled Success
The New American Automatic
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FOR DWELLINGS, PUBLIC BUILDINGS, RAILWAY STATIONS, OFFICES, &c.
Low Pressure, Self Regulating Economical, Cheap, Durable.
UNIFORM HEAT NO GAS NO DUST OR SMOKE NO OBJECTIONS
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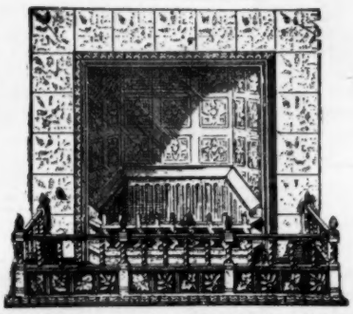
PHILADELPHIA GRATE WORKS.

THOMAS S. DIXON & SONS,
MANUFACTURERS OF

FINE **GRATES**

Furnaces, Ranges.



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Gas-Log Fires.

IMPORTERS OF ENGLISH AND FRENCH FIRE-PLACE FITTINGS.
1330 Chestnut Street, - - Philadelphia.

DETROIT STEAM RADIATOR CO.'S Patent Cast Iron Steam Radiator.

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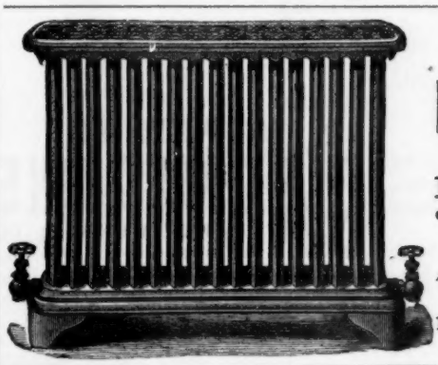

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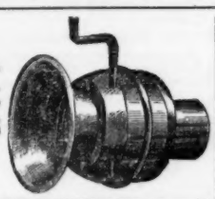

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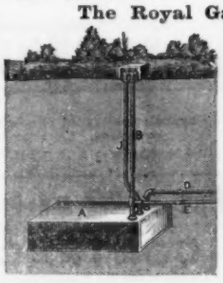

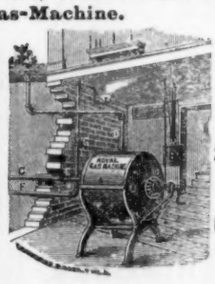

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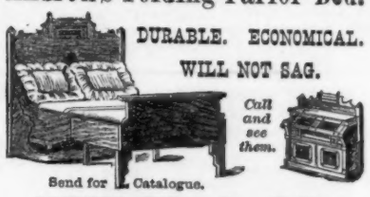

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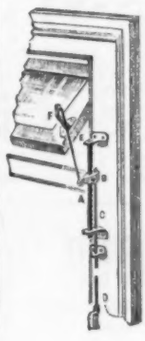

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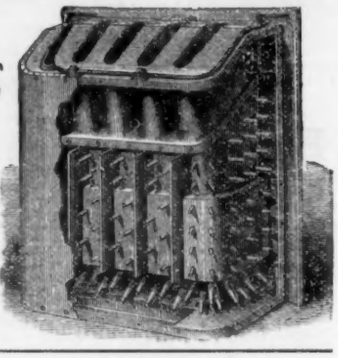

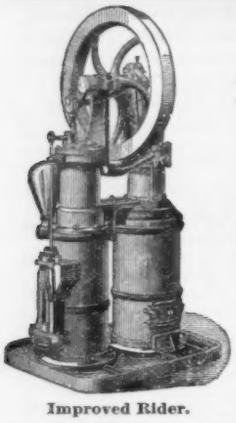

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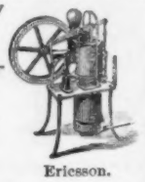

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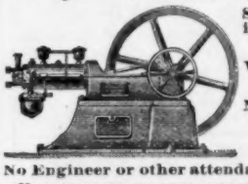

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THE finishing touch is at last to be put to the painful caricature which makes the lower part of the dome in the Capitol at Washington ridiculous, by the addition of a new jumble of what are supposed to be historical subjects. Many of our readers will remember that the late Signor Brumidi, after completing the clever decoration in the upper part of the dome, was seized with the unfortunate idea of painting a fictitious bas-relief around the bare white walls of the Rotunda, and, as there was no one in Washington with energy enough to prevent him, he actually spent many years of his life in carrying out this dreary joke. When he died, about a third of it still remained to be done, and the work has been continued by Signor Costigini. Whether the deceased artist had any definite scheme of subjects in mind we do not know, but if so, the design for the portion yet incomplete seems to have been lost, and its place has been supplied by the selection of three important events, which are to be illustrated in due sequence. The first of these is the "Capitulation of the City of Mexico," which is to be represented by a figure of General Scott, receiving the keys of that unfortunate town. This, if the keys, the city, and the generals on both sides are all properly labelled, may perhaps, be intelligible to those who, years from now, shall conquer their disgust at the infantile "sell" involved in the whole scheme of the decoration sufficiently to inquire what it represents; but even labelling will, we are afraid, hardly make the last two subjects, the "Discovery of Gold in California," and the "Driving of the Last Spike in the Pacific Railroad," either comprehensible or artistic. The latter, especially, surpasses in unsuitableness for any form of artistic representation all the other themes upon which the decorators of the Capitol have lavished their skill, and we hardly know how anything more than that could be said; while the former presents exactly as much inspiration as the discovery of a turnip by a hungry tramp, and a good deal less opportunity for picturesque treatment.

THE clever "architect of the beasts" writes to *La Semaine des Constructeurs* concerning the proper way of building shelters for sheep, and those of our readers who are likely to be called upon to design farm-buildings might do well to remember his instructions. The first criticism that he makes upon the ordinary close sheds used for the purpose is that they are not sufficiently ventilated for the health of the sheep. In Norway, it is said, as well as in Holland, which has a much colder climate than France or England, sheep live out of doors the year round without inconvenience; but where merino or other sheep of delicate constitution are kept, they should be provided with a cover to protect them from the heat of the sun in summer, and in winter from rain and wet snow, which soak their fleeces, and often chill them fatally. The sheds for this purpose may with advantage be closed with a wall on the north side, but left either entirely open, or sheltered with louvre-boards, on the south. If built thus, they can be kept dry and wholesome throughout the year. The doors of such buildings, especially, should be very wide, and ought to open by sliding. Sheep, in going in or coming out of their houses, crowd upon each other, all trying to get out at once; and in the crush the lambs are sometimes killed, while the sheep nearest the sides of the doorway are pushed against the timbers or stones, and often leave tufts of their wool on the sharp edges, or suffer bruises. To prevent this in part, the "architect of the beasts" recommends that the jambs should be provided with vertical rollers to prevent friction, and facilitate the movements of the sheep nearest the side. With the same idea, of preventing the crushing of the animals against the jambs, a platform, of the same width as the door, may be placed in on each side of it, slightly ascending to the threshold, which is raised. With these the crowding in the opening cannot take place, as the sheep at the edges of the platform are pushed off before they reach the door. In alloting space for housing a flock, it may be useful to remember that the shorter diameter of a sheep, or the space he occupies when eating, side by side with others, is about twenty inches, while the average length is about five feet. The rack generally used for feeding measures about nineteen inches in width, so that twenty inches by six feet seven inches will be the space required for each animal while standing and eating.

AN explosion of dynamite took place recently in France, resulting in the instant death of nineteen persons, and the destruction of the building in which they were at work. The building was a small one, of wood, occupied as a workroom for filling cartridges, and to prevent the shock of a possible explosion in it from communicating itself to neighboring structures it was surrounded by heaps of earth. The cause of the catastrophe is unknown, all the witnesses having been killed; but any one of many slight accidents, the dropping of a cartridge, or of the scissors used to trim its paper envelope, the presence of a gravel stone in the dynamite sand, or the slamming of a door, would have been sufficient. It is certain, however, that only forty pounds of dynamite, containing thirty pounds of nitro-glycerine, exploded, but this quantity was sufficient to blow most of the operators, all but two of whom were girls or women, into small fragments, which were found scattered over a space of considerable extent. The only object found among the débris which presented the slightest sign of life was a bird, which had probably been flying over the spot, and was stunned by the shock. It was found paralyzed, and incapable of movement, although there were no signs of actual injury. The sound of the explosion, although the weight of the detonating material was less than that of an ordinary charge of powder for a heavy gun, was heard six or seven miles away. No doubt the enclosing of the building with banks of earth, by confining the force of the expanding gases, rendered their effect more violent within the building itself, but there would have been little advantage for the occupants in mitigating the power of the explosion, which, as it was, deprived them of life with merciful swiftness; and it is quite possible that this precaution may have saved scores of their fellows from sharing their fate.

AT the recent reunion of the graduates of the Ecole Centrale, M. Pasteur gave a little account of his researches into the causes of hydrophobia, which, as reproduced in the stenographic report of *Le Génie Civil*, has a remarkable interest. Almost nothing is known by physicians of this dreadful disease, and its very existence is denied by some, but the obscurity of the subject seems to have given it an additional charm for M. Pasteur, and his investigations have been made with a thoroughness which will give the results a character of certainty. One of his first and most important discoveries is that the disease acts through the brain upon the nerves. It has long been known as almost purely a nervous affection, post-mortem examinations of the victims showing no serious changes in the organs of the body; but M. Pasteur has proved that the brain and spinal marrow are engaged, by inoculations upon the membranes of the head with the saliva from a mad dog, reproducing the disease in this way with absolute certainty, and great rapidity, while the virus introduced into the circulation, as by a bite, developes the characteristic symptoms in only about one-tenth of the subjects, and after a long period of incubation. It is found, moreover, that collections of virus, of the same sort as that contained in the saliva, but unmixed with extraneous matters, form in certain portions of the brain and spinal marrow, the number of deposits increasing with the progress of the malady, until death takes place. In order to propagate the disease, a small portion of brain-matter or marrow is taken from

a rabid subject, rubbed with water or sterilized *bouillon*, and applied to the brain of the animal to be infected, a piece of the skull being removed for the purpose by trepanning. The operation occupies only about five minutes, and the animal is made insensible by chloroform, so that when the small wound is dressed, and he returns to consciousness, he shows no sign of suffering. Between the eighth and the fourteenth day afterwards, however, he is invariably attacked with hydrophobia, and if the virus was administered in its normal condition, he always dies.

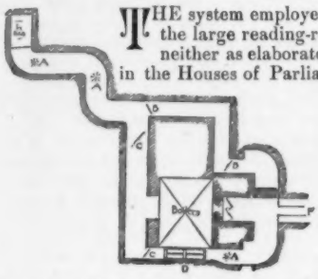
WHEN the contagion takes place through the circulation, as by a bite, or by injection of virus into the veins, the period of incubation is, with human beings, very much more protracted, months, and sometimes years elapsing before the fearful symptoms declare themselves. Among animals the rapidity with which the disease develops varies. So far as M. Pasteur's observation goes, it invariably originates in the dog, although there is an idea in this country that foxes are quite as liable to it as dogs, and sometimes communicate it to other animals. However that may be, the bite of a mad dog induces hydrophobia in many other creatures: cattle, horses, and pigs are readily infected, as well as monkeys and rabbits, the latter, particularly, being seized with the disease very quickly after being bitten. According to M. Pasteur, there is reason to suppose that by successive inoculations, conducted with precautions which experience has taught, the virus of hydrophobia may be so attenuated as to be used like vaccine virus, for protecting dogs and men against the unmodified disease, but this must be done through the medium of animals, since, so far as is known, the virus of rabies cannot, like that of carbuncle, be cultivated artificially, and attenuated by exposure to the air. In the hope of finding the means for accomplishing this result, M. Pasteur keeps a great number of animals under treatment. Hundreds of dogs, rabbits, and other creatures have been, as gently as possible, subjected to the disease, in order that from their death might be derived the knowledge necessary to save other beings of greater capacity for suffering, from a similar fate.

HITHERTO, no experiments have been made upon human beings. M. Pasteur, in his anxiety to gain the knowledge, so indispensable to his object, of the effect of the virus in different forms upon men, has often thought of asking for subjects among criminals condemned to death, but, with humane reluctance, has refrained. Meanwhile, however, he has had repeated offers from persons interested in the subject in one way or another, to submit themselves to inoculation for the benefit of science. The story of one of these cases, as told by M. Pasteur, is an extraordinary one. Not long ago, he received a letter from a certain professor, in these touching words. "Sir," said the letter, "I have been bitten by a mad dog. I begin to experience the symptoms of that frightful malady. I wish to spare my beloved family the sight of my torments and death from hydrophobia, and have therefore arranged my affairs, and am about to leave the town where I live for another, where you may reply to me. I place myself entirely at your disposition, happy in the thought that I may be useful before I die. If you will designate a hospital in Paris, I will go there, and you shall do with me what you like." M. Pasteur said that he dared not at that time ask his unfortunate correspondent to come to Paris, not having carried his experiments with dogs far enough to show him the possibility of preventing hydrophobia after infection had taken place, but with the humanity that comes of knowledge, he inquired further, and found that the incipient hydrophobia whose convulsions he was asked to utilize for the benefit of mankind had declared itself eleven days after the patient had been bitten. Knowing that this was far too short a time for the development of the poison by means of the circulation, he suspected that some other affection might have been mistaken for the disease, and ascertained that the professor, who had been bitten in the hand, had had the wound immediately cauterized, but before this was done, in the pain of the bite, had instinctively carried his hands to his lips. There was probably an excoriation on the lips, and by means of this some poisonous germ, differing from that of hydrophobia, was conveyed into the blood, giving rise afterwards to an inflammation in the mouth and throat, which had been mistaken for the commencement of the spasmodic affection of hydrophobia. All this was explained by the great chemist to his terrified correspondent, and the latter finally returned to his home, where the trouble in his throat subsided, and he was soon perfectly and permanently cured. We imagine that there is not often much romance about vivisection, but a more dramatic incident than this it would be hard to find in the history of any science, and we commend it to the attention of novelists in search of a new theme.

A NEW theory of the formation of coal has been suggested in France by M. Paul Noel, and is described in an article in the *Journal de l'Agriculture*. Every one, probably, has some loose notion that the coal beds in the earth are the remains of vast forests, which have been covered with alluvium by some subsidence of the ground, and have decomposed, shut out by the mass above them from contact with the air. The proof of this is generally supposed to consist in the fact that most coal mines show traces of vegetation; leaves of fern, of immense size, trunks and branches of trees, and other vegetable products, being often found in them, converted into a black, shining substance, but retaining their original form. This theory certainly seems reasonable, but there are difficulties about it which have not yet been explained. The most serious of these lies in the fact that the chemical composition of coal does not agree sufficiently well with that of wood to show a similar origin. Of course, coal, like charcoal, differs from wood in containing no hydrogen, which would naturally be driven off in the process of decomposition; but the partial decomposition which is supposed to have taken place would affect only the volatile constituents of the mass, and if this had been composed of leaves or trunks of trees, the residue or ash, left after burning coal, should be the same as that left by wood or charcoal, which is far from being the case. Again, the evidence afforded by the finding of carbonized vegetable forms in the mines is rendered less convincing by the fact that these objects do not exist in the mass of coal itself, but are always discovered at the edges of the bed, or directly above or below it, and generally embedded in the rock which forms its boundary. Another curious circumstance is that the fern-fronds and trunks at the edges of the coal always lie in parallel lines, presenting an appearance which differs entirely from that of an ancient forest, and suggests rather the effect of an inundation of soft material, bending the vegetation over which it passed in the direction of its course, and carrying long lines of floating leaves and drift-wood. There is much further evidence that all coal was once in a plastic or liquid condition, both in the fact of its being found in situations and under circumstances which cannot be otherwise accounted for, and in another, to which M. Noel calls attention, that the coal varies in character with the rock on which it lies, the beds upon hard rock being usually bituminous, while those overlying soft, porous strata have been, as it were, filtered, the more liquid constituents of the mixture, such as petroleum and bitumen, soaking downward into the stone, and leaving only the hard anthracite.

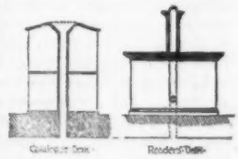
IT is generally admitted by geologists that all coal beds once formed the bottom of lakes, of fresh or salt water, and M. Noel believes that this fact indicates an explanation of the production of coal which will remove the difficulties of the old theory. It is hardly conceivable that wood, especially through the loss of its hydrogen, should ever become converted into a substance plastic enough to flow like a river, taking the impression of objects along its banks; but it is not difficult or unreasonable to suppose, instead of this, that the stagnant lakes of the coal districts were, ages ago, when the temperature of the earth was higher, and vegetation more luxuriant than now, filled with the little plants which even now discolor our drinking water, and that these, dying and settling to the bottom, may in time have so accumulated as to form a layer of carbonaceous mud of considerable depth. Something of the kind still goes on in such ponds, the bottom of which are usually covered with a light, black mud, while the bubbles of carburetted or phosphuretted hydrogen which rise when this mud is stirred, show that it is in process of conversion into something at least very similar to coal. Such mud, if it could be supposed to accumulate undisturbed, would present perhaps all the qualities necessary to fit it for conversion by decomposition into coal. The presence of certain salts and mineral substances, which are often found in coal ashes, but never in wood, might be due, on this theory, to impurities dissolved or suspended in the water of the carboniferous lake, and even the formation of petroleum, naphtha, and bitumen, in connection with coal, is at least as easily explained by this hypothesis as by the old one.

HEATING AND VENTILATION OF THE BRITISH MUSEUM.

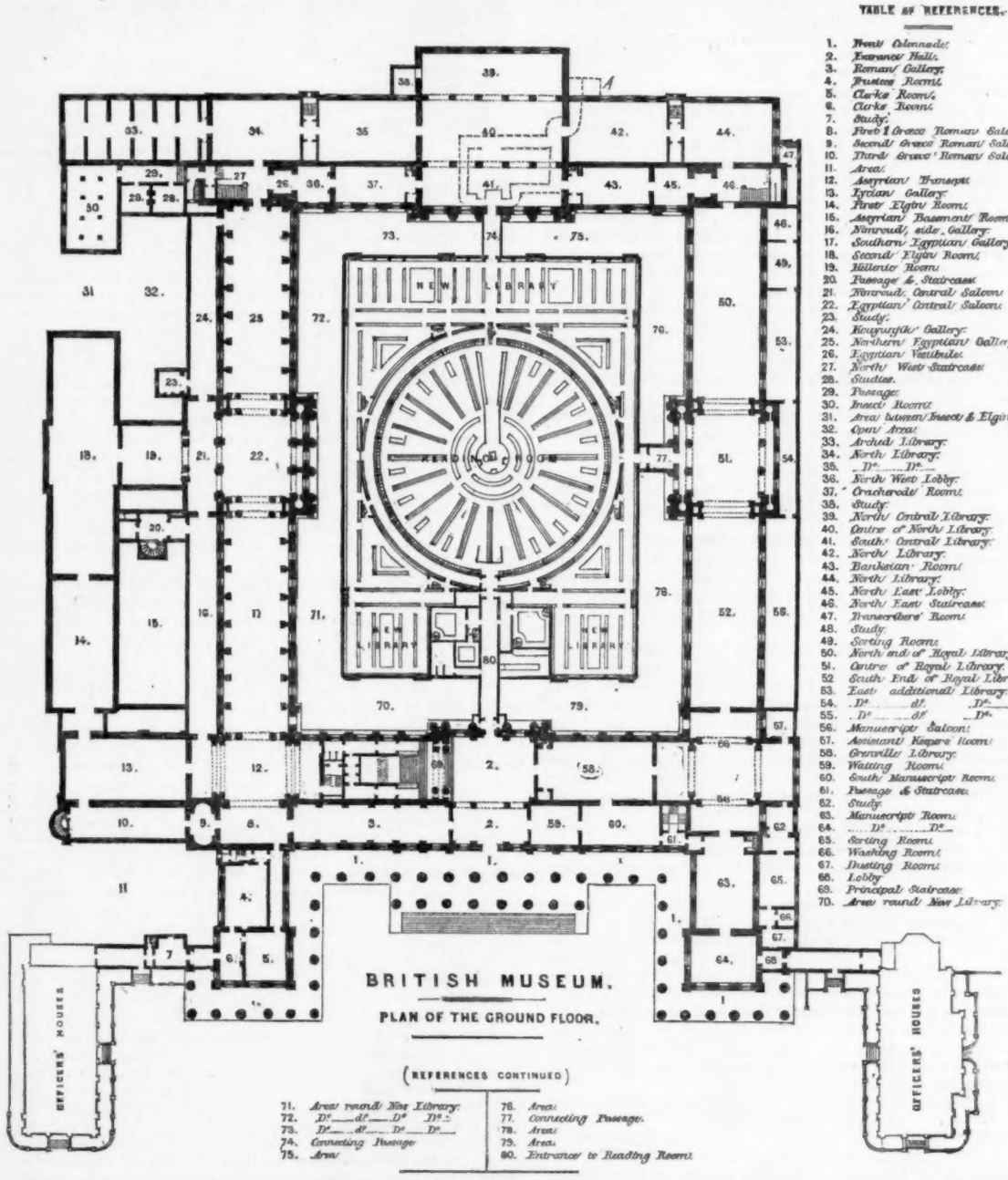


THE system employed for heating and ventilating the large reading-room of the British Museum is neither as elaborate, nor as successful as that used in the Houses of Parliament; still it has many interesting features, and is well worth study. The system is the result of many years of experiments and failures, and is doubtless but little like what was put in when the room was first opened, twenty-seven years ago; though the building seems to have been planned with reference to something like the existing arrangements. It will be noticed that the reading-room and the adjoining apartments for the storage of the books stand alone in what was the central court-yard, being connected to the main building only by the narrow passages at front and rear. The heating and ventilation of this department is quite distinct from that of the other portions of the Museum; though properly speaking the reading-room is the only part which has any systematic scheme for ventilating in connection with the heating.

Fresh air is taken in at the top of a tower on the north side of the building, through openings fifty to sixty feet above the ground, and protected only by large louvres. No screen is used, but as this side of the Museum is in the centre of the block, and protected by buildings on all sides, very little dust ever finds its way into the openings. Inside the tower is a spray of water to cool and purify the incoming air, though the actual advantage of this is practically not very obvious. The air passes down the shaft into cellar passages, where it is moistened by additional sprays of water, and is led to a fan sixteen feet in diameter, which forces the air into the passage beyond, and from thence into the cellar under the reading-room, the whole of which is utilized as an air-chamber, though the space is so much cut up by the radial walls supporting the brick arching that the air does not circulate as freely as might be desired. To obviate this difficulty air is taken into separate sub-ducts from just inside the fan, and led directly to corners of the air-chamber, which are too much enclosed by the radial walls to feel the general circulation. In this way the entire chamber is kept moderately well filled with fresh air in motion, and a nearly constant current ascends from all the openings into the room above.



As will be seen by the general plan of the building, the readers' desks radiate from the centre, the inner circular lines being the catalogue-desks. These desks are built back to back with a narrow open



space between, as shown by the sketch. Under each line of desks are continuous openings in the floor, from which the air rises between the partitions, and escapes into the room above the readers' heads. Air also escapes lower down at the ends of each row of desks. If draughts are felt these lower openings can be closed, but the upper ones always remain open.

In warm weather the course of the incoming air is as above described. The air is never cooled any further than by the sprays of water. The engineers claims they will reduce the temperature by ten degrees, but this seems doubtful, as under similar conditions four degrees reduction is all that is counted on at the House of Commons. If the weather is moderate the fan is not used, the fresh air being led around it by side passages and directly to the air-chamber.

During cold weather no provision is made for adding moisture to the air. The sprays of course are useless at such times. The air is led directly to the passage beyond the fan, and heated by hot-water pipes before passing to the air-chamber under the reading-room. Should the weather be unusually cold, the air is further heated by being passed over the boilers, which are enclosed in tight shells and set up free from the masonry, giving passage for the air above and below. The boilers and fire-boxes are said to be sufficiently air-tight to prevent any coal-gas from leaking into the air-supply. From in front of the boilers air is led to the corners of the air-chamber by sub-ducts, as previously described.

The initial sketch-plan shows the arrangement of the cellar passages. The jets of water are at A. At B and C are gates by which the passages can be closed and the air sent in either direction as desired. The fan is at D. The passage F leads to the air-chamber under the reading-room. It will be seen that the doors C and B afford a means of regulating the amount of heat supplied to the reading-room independently of the amount generated by the boilers.

The reading-room is one hundred and forty feet in diameter, the dome being one hundred and six feet high. Just at the spring of the dome is a row of wide windows, which are fitted with double sashes, and cut up into the curve of the dome. At the bottom of the outer sash is a movable shutter, swinging out. The seat of the inside finish swings down, thus giving an opportunity to introduce additional fresh air into the reading-room. A large steam-pipe runs across the bottom of each window between the sashes. In winter the outer flap is closed, and the steam-pipe heats the air in the space between the sashes, thus preventing any down draughts of cold air from these windows.

A portion of the vitiated air escapes through the openings in the soffits over the windows before mentioned. The remainder escapes through the eye of the dome into the lantern, which is made with double sashes, and provided with steam-pipes both in the air-space between the sashes, and inside over the glass ceiling of the reading-room, so that there is very little chance for any down draught in winter.

The book alcoves are heated by direct-indirect coils of hot-water pipes, drawing air from the central court. There is consequently hardly any draught in summer time. The exhaust is through flues in the brickwork, which are carried up into the space immediately over the windows of the dome. These book-rooms appear to be quite insufficiently ventilated.

The Museum guides say the ventilation of the reading-room is often complained of; but judging from personal experience it operates far better than would be expected in most public reading-halls of the same size. When the fan is in operation, the air is changed about three times an hour, on the average. In the moderate weather such as London has so much of in the early fall, the fan is not used, and as the provisions for extracting the air are so inadequate, the room often seems close and musty. The scheme of ventilation can hardly be called a success, though more might be done by a better use of the existing arrangement. When the fan is in operation closeness of the air is seldom felt. The reading-room often receives as many as four hundred persons at one time, including the attendants. The temperature is kept at 63° in the winter — a trifle low perhaps for American ideas.

The Museum proper has very little heating, and almost no ventilation. The halls and stairways have no heat at all. The rooms are mostly provided with direct-indirect coils of steam or hot-water pipes, laid in the floor, and having fresh-air supply from out of doors, and a few rooms are heated by indirect radiation from coils in the cellar. The skylights over the upper rooms are provided with small ventilating openings at the ends, and some of the rooms are connected with mushroom ventilators on the roof; but the engineer informed me that these were all carefully closed in winter. Still the stories are so high, and the rooms are connected by such wide openings that the lack of ventilation would not often be noticed.

In heating the entire Museum and reading-room, the engineer says he rarely uses over twelve tons of coal per day.

C. H. Blackall.

The Rathhaus at Augsburg—The most famous of the buildings which Elias Hole raised at Augsburg is at present threatened. The city authorities are preparing to erect a huge block of public offices against the Rathhaus, which would quite overshadow and destroy its proportions. Fortunately an influential opposition has been roused among the Augsburgers themselves, which should be reinforced by protests from foreign sympathizers. — *Exchange.*

NEWPORT.[1]

It must be confessed that American cities are uninteresting; that they are pervaded by an air of careless haste in construction and design, that there are few impressive or characteristic features, that picturesqueness — *real* picturesqueness, either accidental or contrived — is conspicuous by its absence; that the architecture is too often distinguished in the richer quarters by vulgar pretension, and in the poorer quarters by squalid commonplaceness. The "march of civilization" is here too rapid, too frenzied, we might almost say, to allow of much consideration for what does not appeal to the general appreciation. It follows that the interest of travel in the United States, if we except what attaches to natural scenery, is confined in the main to the statistician, to the politician, or the student of social or political economy.

Among the crowd of modern American cities there are, however, a half-dozen sleepy old towns lying all along the Atlantic seaboard, upon which the smart genius of our marching civilization has forgotten or scorned to set his shining seal. These towns make but a poor showing in the census reports; they have no boasts to make of a population doubling once in ten years or so; no ten-story buildings of ambitious design attract the wondering gaze of the stranger; a little grass here and there in the quiet streets, a little moss on walls or roofs, tell the story of commercial and social decay.

For this absence of the prosperity which has come to be regarded as the birthright of American cities, there are yet compensations to the residents of these old towns, in a certain softness and poetry which invests them: the unforced picturesqueness of the old time, the quaint flavor of historical association, "the tender grace of a day that is dead," the atmosphere of refinement and repose, all the more alluring from its extreme rarity, and the sharp contrast which it offers to the general life of American towns.

Among these cities of the past, few are more marked by the characteristics of which we have spoken than Newport, a hundred years ago a centre of commercial activity and enterprise, and of social distinction, but now stranded on the shore of the great stream of American progress, and condemned to see its honored name represent a newer Newport at its gate — the chosen seat of the most frivolous, the vainest, the most pretentious and flamboyant *nouveaux riches* of the Western world.

Mr. Mason's "*Reminiscences*" are the pleasant gossip of an old resident who has spent his life among the scenes and people of whom he speaks, and who is glad to be, by every association of birth and personal experience, identified with the history and life of his native town. His fondness is justified by many lively and interesting accounts of the notable personages who have figured at one time or another in the placid annals of the old town — of Commodore Perry, whose fame is dear to Newport, which has set up his statue in the public park; of Malbone, the painter of miniatures, of whose origin and history little is known, but whose first triumph in art is said to have been the painting of a scene for the little Newport theatre, and who pursued his studies here with Washington Allston, and travelled with him to Charleston and to England; of Abraham Redwood, the good Quaker, a lover of books, who came early in the last century from Antigua to Newport, where he pursued his honorable career as a successful merchant and also as a prominent member of the philosophical society of which Berkeley was the head during his stay on the island, and where he founded the library which has continued to this day one of the most cherished among the institutions of Newport; of Talleyrand, who stepped ashore one spring morning in 1794, from a New York packet, took a quiet lodging, and went out and in among the people of the place for three months or so, with the inquisitive enterprise of his race, and departed as quietly as he came, without the sharpest quidnunc having discovered that one of the most conspicuous figures of the eighteenth century had been amongst them — an account which the active reporter of to-day will read with unutterable feelings; of the good Bishop Berkeley, who landed at Newport in 1728, and lived there for three years, building himself a house some little way out of town, where he could enjoy, with his young wife, the quiet and freedom which his position at home doubtless made impossible; of the Reverend James Honyman, sent over to these western wilds in 1704, as a missionary, by the Society for the Propagation of the Gospel in Foreign Parts, and who presided over Trinity Church from that time till his death, near half a century later; of whom it is told how, when Dean Berkeley arrived in the harbor on a holy-day, when divine service was being held in the little church, the Dean wrote a letter to Mr. Honyman, which was speedily handed up to him in the pulpit. "He opened it and read it to the congregation, from which it appeared the Dean might

[1] "*Reminiscenses of Newport*," by Geo. Champlin Mason. Illustrated. Newport, R. I. Published by Chas. E. Hammett, Jr. 1884.

be expected to land in Newport every moment. The church was dismissed with a blessing, and Mr. Honyman, with the wardens, vestry, and congregation, male and female, repaired immediately to the Ferry Wharf, where they arrived a little before the Dean, his family and friends."

There is an interesting chapter on the Jews of Newport. Nothing in the history of the old town is more characteristic than the prominence, not only in trade, but in all the enlightened public enterprises of the community, attained by the representatives of this much insulted and proscribed race. Moses Lopez and Jacob Joseph were among the founders of the Redwood Library; Mrs. Pollok fed the hungry poor in a winter of unusual severity, until the citizens came to her aid and organized a relief committee; the memory of the Touros is held among all classes as among the most precious legacies which have come down to them from the past. And these are but the conspicuous examples of a long line of industrious, simple-minded, self-respecting citizens, who for more than a century contributed to the prosperity and reputation of Newport.

We find here the first account we have seen of Michele Felice Cornè, an Italian painter who came to this country in 1799 and found his place as the earliest decorative painter on this side the ocean. He landed in Salem, where he found so little employment that he shortly "removed to Boston, where he was occasionally called upon to decorate interiors in his best manner. The walls of the Hancock House were painted by him, and he had probably other like orders. . . . . His custom was not to paint directly on the wall, but to cover the whole surface with wide strips of white paper, joining the edges neatly and putting it on like ordinary wall-papers. On this he first sketched his subject in charcoal and lead-pencil, and then washed it in with water-colors, using on the foreground opaque colors laid on with size, which gave his work more body than he could secure in any other way." Cornè had great facility in the drawing of ships, and this facility finally made his fortune. The war of 1812, with Great Britain, of which so many of the events were sea fights just off our own coast, created an excitement in the seaboard cities, which Cornè availed himself of by painting large pictures representing the various naval combats, as they followed each other in quick succession: the fight between the Constitution and the Guerrière, the Hornet sinking the Peacock, the Battle of Lake Erie, and others of similar character. These pictures were placed on exhibition, and the painter was able at last to gather the harvest for which he had been long waiting. "Cornè's pictures were exhibited as long as they would hold together. They were all painted in distemper and with but indifferent materials. By the time they were worn out the public interest in them had abated, and finding that a further attempt in the same line would not be likely to succeed, he had the good sense to give over and withdraw from the field. Having settled his affairs in Boston, he left that city for a more quiet and retired residence and found his way to Newport, arriving there in 1822, where he lived at ease during the remainder of his days."

A curious chapter is that on the small-pox hospitals of the last century, established by private enterprise for the reception and treatment of persons willing to undergo inoculation for that disease. Some island in convenient proximity to the great lines of travel was usually selected, and advertisements set forth in attractive colors the advantages and inducements of the place. At Fisher's Island, for instance, Jonathan Loomis proclaimed that he "had travelled to Philadelphia for the express purpose of learning the business of inoculation." At Duck Island, John Elisha Ely "declared that during a period of twenty-seven years several hundred persons had been inoculated, without the loss of a single patient, and that they continued to furnish, with their unsurpassed treatment, every luxury that could be looked for in such an establishment, at a cost not exceeding £1 lawful money. . . . Of out-door sport there was no lack, and when night closed in, one could sing and dance at Duck Island till bed-time. An old negro, white-haired and with whiter teeth, who had the 'Rakes of Mallow' and the 'Miller of Mansfield' at his fingers' ends, scraped the fiddle and called the figures." Samuel Lee, in 1795, "made it known that there was a good chance for eighteen or twenty young gentlemen and ladies at a time to have the small-pox in a mild and safe form, and at the same time to enjoy the best of fishing, hunting and boating. Application was to be made at the Old Hospital at New London, near the light-house. The season opened in May and closed with frosty weather." Some of these enterprises were, however, under official supervision. "In 1792 the town of Newport set apart Coaster's Island as a place where persons so disposed could go and be inoculated. . . . Dr.'s Jonathan Easton, Jr., Isaac Senter, and Benjamin Mason, all leading physicians, agreed to divide the labor, with the understanding that those persons who were able to do so should pay a fair consideration, while the poor should be treated gratis."

Mr. Mason's book is published in very attractive style, and is embellished with half a dozen beautiful heliotypes, and with numerous wood-cuts, which are a little more hasty than one could wish.

A Legend of the Eucalyptus.—The eucalyptus tree has hitherto been in favor for its anti-malarial properties, which are especially familiar in Australia, where it is one of the loftiest of timber trees. It has, however, lately lost favor in the province of San Pedro, Brazil, from the belief that it stimulates the generation of a poisonous dragon-fly, which attacks all living creatures, to whom its sting is fatal in a few minutes. The destruction of all eucalyptus trees has, therefore, been ordered in San Pedro.—*Philadelphia Press.*

THE DISPOSAL OF TOWN SEWAGE AND OTHER REFUSE.

In the Health Department of the Social Science Congress at Birmingham, the first question was:—"What is the best method of dealing with (*a*) Town sewage? (*b*) The products of home and street scavenging? and (*c*) The products of combustion?" papers being read on these three subjects respectively by Mr. E. Pritchard, Mr. Lawson Tait, and Captain Douglas Galton. The latter we have already published. As the discussion appears to have turned chiefly on the sewage question we give extracts from two papers which dealt with the sections *a* and *b*.

Mr. Pritchard, in regard to the first part of the question, said:—

Had this question been asked me some fifteen or twenty years ago, I, like many others, would have suggested irrigation; but experience of the last few years has caused a modification of my views, and the answer now would be to the effect that local circumstances must of necessity govern the particular method of treatment; and what might possibly be considered the best system for one place would prove to be an undesirable one for adoption in another.

The methods generally adopted in this country for the disposal of town sewage, and to which I propose to briefly refer, I have classified as follows:—

1. Land purification.
2. Chemical precipitation.
3. Discharge of sewage into the sea.

Under the first head may be considered two methods for the purification of sewage:—(*a*) sewage irrigation; (*b*) intermittent filtration.

(*a*) *Sewage Irrigation.*—Broad irrigation is the application of the minimum quantity of sewage to the maximum area of land, whereby the sewage is allowed to flow over the land, the greatest return being obtained from this process of sewage utilization. With suitable land and proper management good results are obtainable without the creation of nuisances; but as the true value appears now to be more generally known, sewage treated by broad irrigation, unless under exceptional circumstances, does not at the present time find much favor. It is estimated that one acre of land will purify the sewage from fifty to one hundred persons; this is on the assumption that such land is not continuously treated. Heavy crops are obtainable from land so treated; large quantities of rye grass, mangel wurzel, and various green crops being readily grown. On the Earl of Warwick's farm at Leamington, a few years since, over eighty tons of mangels per acre were grown. It will, however, be perceived that in broad irrigation the first consideration would generally appear to be "how to make it pay," leaving the purification of the sewage as the lesser factor.

(*b*) *Intermittent Filtration.*—In 1868, Dr. Frankland, one of the Rivers Pollution Commissioners, determined, by experiments, that by deep drainage of land of a suitable description, sewage could be purified in large quantities upon a small area. This system was termed "intermittent downward filtration," and requires that the land shall be laid out in level beds, and properly drained at a sufficient depth, the surface of the land being prepared in a ridge and furrow, and upon the ridges green crops can be successfully grown. As the name implies, the sewage is applied in an intermittent manner. This process of sewage treatment is a costly one in the first instance for the preparation of the ground, the outlay in some instances reaching a sum in excess of £200 per acre, whilst the cost of preparation of ground for broad irrigation might not exceed, under favorable circumstances, £10 to £15 per acre. The cost of works, however, whether for irrigation or filtration, must be governed by local conditions, my own experience proving that sums from £7, 10*s.* to nearly £700 per acre have been expended in the preparation of land for sewage treatment.

The treatment of town sewage by chemicals has now occupied the attention of engineers and others for many years. I do not propose in this paper to refer to the numerous processes that have been brought before the public during the past twenty years; and although not prepared to support a scheme of chemical precipitation *per se* for the purification of sewage, assuming the effluent has to be discharged into a stream of ordinary purity, still I am strongly of opinion that great improvements have been made, and it is somewhat satisfactory to find that lime, the first precipitant used, still holds its own as being able to produce fair results in sewage purification. The great difficulty for many years was how to dispose of the considerable volume of sludge, which is the natural result of precipitation. This difficulty has, however, been successfully overcome by means of the improved system of sludge presses in operation at various works. The sewage

effluent from any scheme of chemical precipitation should pass through a properly-constructed artificial filter, or through land deeply drained on the principle of intermittent filtration.

The sewage from towns situate upon the sea coast is generally cast into the sea, at a point below low-water mark. In some instances this is done without in any way separating the heavier matters held in suspension; in other instances, — notably Brighton, Torquay, and other places, — intercepting-sewers have been constructed at considerable cost, by which means the sewage has been diverted to a point some distance from the town, where the influence of the tides has not exerted any disagreeable effect upon the towns so sewered, by causing any return to the beach of the sewage discharged. In other instances sewage from large cities and towns, such as London, Liverpool, Glasgow, Newcastle, and Bristol, is discharged into tidal rivers. This emptying of sewage into rivers is, however, in some instance, productive of great nuisance to the public, and injury to the river. At the present time a Royal Commission is sitting to consider remedial measures for the metropolitan sewage. I had the honor of appearing before such Commission as a witness, and advised what, in my opinion, was the most desirable course to adopt, viz.: the extension of the existing outfall sewers of the metropolis, so that the sewage may be discharged into the sea beyond the range of tidal influence, even assuming that such works would entail great outlay.

Mr. Lawson Tait, in treating of "The Utilization of Town Refuse," gave some account of his practical experience in dealing with the sewage of Birmingham. He said that Birmingham, from its situation on the highest part of the Midland district, was obliged to adopt in its early history the system of surface household wells, and until recently these had an almost universal prevalence throughout the town; indeed, they exist now in very large numbers. Closely associated, the midden privy was constructed, and in 1871 there were nearly 20,000 of these centres of disease existing in the borough, their aggregate area exceeding thirteen acres. As by far the greater part of the town is built upon hills of loose sand and gravel, it is perfectly needless for me to say that soakage from the privies into the wells was of constant occurrence, and is still far too frequent. Of these privies about 14,000 drained at that time into the sewers. There were about 7,000 water-closets, the contents of which, together with all the road-sweepings, manufacturers' refuse, and countless other impurities, were turned, and had been ever since the town existed, into the small river traversing its area. Up to 1871, the government of the town was conducted upon lines which it is no part of my business here to discuss or condemn, but no one who knows the town at all but will be able to substantiate my statement that, the new *régime* inaugurated by the distinguished statesman who at the present moment presides over the Board of Trade has, as it were, reconstructed every aspect of our municipal life. The town has improved in every possible way; its death-rate has fallen nearly five in the thousand, and the average age at death has been raised six years, and the whole of these beneficial changes are due to the inauguration of Mr. Chamberlain's sanitary policy.

The problems we had to solve were two, — how we could treat the fluid impurities which ran into the river, and how we could dispose of the solid household refuse; but they were extremely complicated, from the enormous bulk of the material to which they had to be applied, and it is from this chiefly that our progress in their solution was so slow. We found, in fact, that theoretical chemistry was of but little help, and that laboratory experiments were absolutely futile. We sent out inquiries, and we visited by deputation all the large towns in Great Britain which were in any way comparable to our own, and these inquiries and investigations, concurrently with our experiments, occupied a period of nearly seven years. As they advanced, and as the results of our experiments became more accurate and more extended, the more certain did we become that the original conclusions established by the report of the Birmingham Sewage Inquiry Committee were those alone which were applicable to our town. The recommendations were as follows: "The exclusion of animal excreta from the sewers is, in the opinion of the Committee, essential both to the effectual treatment of sewage, and to the health and comfort of the population, and they have arrived at the conclusion that this object may be attained by a reform of the system of exposed privies and open middens now prevailing in the town, and which defile the air, poison the water, and, by means of connecting drains, pollute the sewage."

The first principle we established, and we arrived at it chiefly from the disastrous experience of other towns, where it had not been adopted, was that it was absolutely essential to keep the two elements with which we had to deal, — the household refuse and the excreta, — entirely separate, and for this purpose we established a system of dual and joint collection, which has proved perfectly satisfactory. In the reconstruction of closet accommodation, we filled up the old middens, and replaced them by simple closets, under the seats of which we placed large galvanized pans. These pans are coated inside from time to time with boiling tar, an operation which very much diminishes the smell and enables them to be easily cleaned. Somewhere near the closets ash-tubs, either of wood or iron, are placed, into which the tenants are requested to place their household refuse, and they are strictly forbidden to empty slops into the pans. It took a long time to educate the population to the fulfilment of even these simple directions, and much trouble was encountered for several years in establishing the fresh arrangement. We found that many people objected to it, and clung with a mistaken but most affectionate pertinacity to the foul middens to which they had been accustomed. The arrangements for the collection of the pans and ashes were at first defective, and a good deal of outcry was raised from time to time against the objectionable smells which they emitted as they passed through the streets; but as the details became perfected one after another these objections ceased, and we were not troubled with any complaints. Indeed, the complaints now are all against the old system, for when the remaining middens are to be emptied, the overwhelming stench which prevails all over the neighborhood for some hours after the process is a never-failing theme of complaint from exactly the same people who, when they were accustomed to its nightly recurrence, thought it hardly worth mention.

The collecting-vans are arranged to carry eighteen pans and about one ton of ashes, and the collection is made from each house on the average once a week. When the pan is removed it is covered by a lid, made to fit perfectly tight by means of a strong string and a band of India-rubber, so that any smelling is avoided. The ash-tubs are emptied into a special receptacle at the hinder part of the van. These vans are taken to our central depôt, and there are subjected to processes of which I shall shortly speak.

The continually increasing cost of collection, and the continuously diminishing value of the material gave indications that the continuation of that policy would have been ruinous. At this point it may probably be convenient to anticipate a criticism which is sure to be raised upon the general system of our policy for the disposal of refuse which has been adopted in Birmingham. Towns will be pointed to, of great importance and large size, in which no such costs as these are incurred, and instances of towns where the water-carriage system is in use will doubtless be specially indicated. We may, and probably will, be asked the question, Why has not the water-carriage system been adopted in Birmingham? And there are some amongst us still, I am sorry to say, who are disposed to take such a retrogade step. I need not answer the objection in detail, because the answer to it will be found in the volume I have already quoted, the Report of the Birmingham Sewage Inquiry Committee. Suffice it to say generally, that as Birmingham has a very elevated position we cannot obtain a water supply by gravitation. Every ounce of water used in the town, unless obtained from a soft-water cistern placed on the roof of a house, has to be pumped, and the public supply has to be raised from 200 feet to 600 feet, and I need not say that not only is this an extremely costly process, but that the quantity we can obtain, and from reservoirs, is such as is calculated only for the maximum requirements of a constantly growing population for all purposes exclusive of a water-carriage system of sewage. It is extremely doubtful if we could obtain in any way the additional quantity of water required for this purpose, and even if we could obtain it our difficulties would be increased instead of diminished by every gallon of water-closet liquid which was added to our already enormous bulk of sewage. The conclusion is, therefore, that the true economy is to preserve from waste these materials which having been taken from the land should be restored to it, and that it is a mistake to waste them by such dilution as renders them practically valueless.

Acting upon these principles, the plan we adopted was to act upon the one kind of refuse by means of the other. Immensely to our surprise, and to our no small satisfaction, we found that the solid ash-tub refuse, which amounts to 72,000 tons per annum, would burn in properly-constructed furnaces without the addition of any other kind of fuel, and in this burning it is reduced to one-fourth of its original bulk, and the result is a peculiarly useful silicious clinker, which we turn to all kinds of useful purposes. It has been used to erect buildings with, to make roads and paving blocks, staircases, horse-troughs, tables, and ornamental fireplaces, samples of all of which may be seen at our works. Of this kind of household rubbish there has been about eleven boats per week sent out into the country, the mere cost of transit being £500. If we burned the same amount, the cost would be £270; and if we used all the clinkers, as we hope to do, we should save £230. The burning of this amount would occupy three furnaces of the kind we have erected for the purpose, and of the total bulk of the rubbish thus burned, seventy-five per cent would be dissipated in the form of heat.

In order to utilize this waste heat, the plan adopted by the Health Committee was to apply it for the removal of moisture from the contents of the pans. The means by which this is done is extremely simple. Boilers are placed in the furnaces, and the heat is transferred by means of steam to large machines, of which a working model is here exhibited, into which about sixteen tons of pail-stuff are put as a charge with sufficient sulphuric acid to fix the ammonia. A hot-air blast from the furnace flue is drawn through the machines by means of a blower. The steam is applied by means of a steam-jacket and hollow rotating spindles, and in from sixteen to twenty hours the sixteen tons are reduced to one ton of solid *poudrette* containing from seven to nine per cent of ammonia, according to the time of the year, and from two to three per cent of phosphates. Without any further treatment or addition this forms an admirable manure for top-dressings, and for all kinds of rapidly-growing roots, particularly the beet-root, and in the growth of those vegetables for the purpose of sugar manufacture this kind of manure has been found extremely valuable, and doubtless it will also have a ready sale for sugar-cane and cotton.

Concerning its commercial value no absolutely certain statements can be made. So long as we were making ten or fifteen tons per week, and until we were satisfied we could make a much larger

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Mayence Cathedral, Germany.

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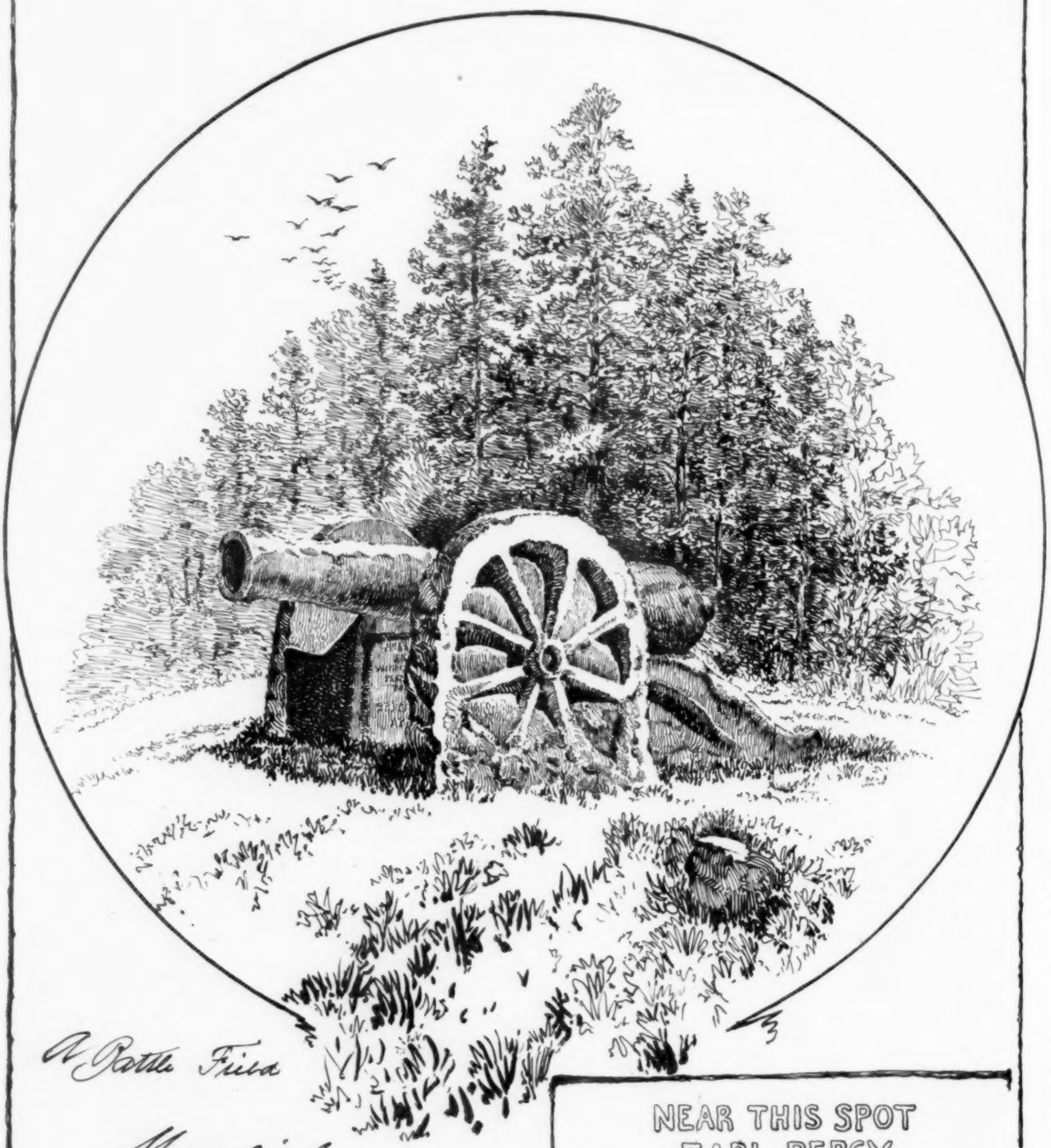

A Battle Field
Memorial
Lexington Mass.
Jos. R. Coleman
Archt.

NEAR THIS SPOT
EARL PERCY
WITH RE-ENFORCEMENTS
PLANTED A FIELD-PIECE
TO COVER THE RETREAT
OF THE
BRITISH TROOPS
APRIL 19 1775

The Heliotype Printing Co. Tremont St. Boston.

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Stable at East Oakland, California.
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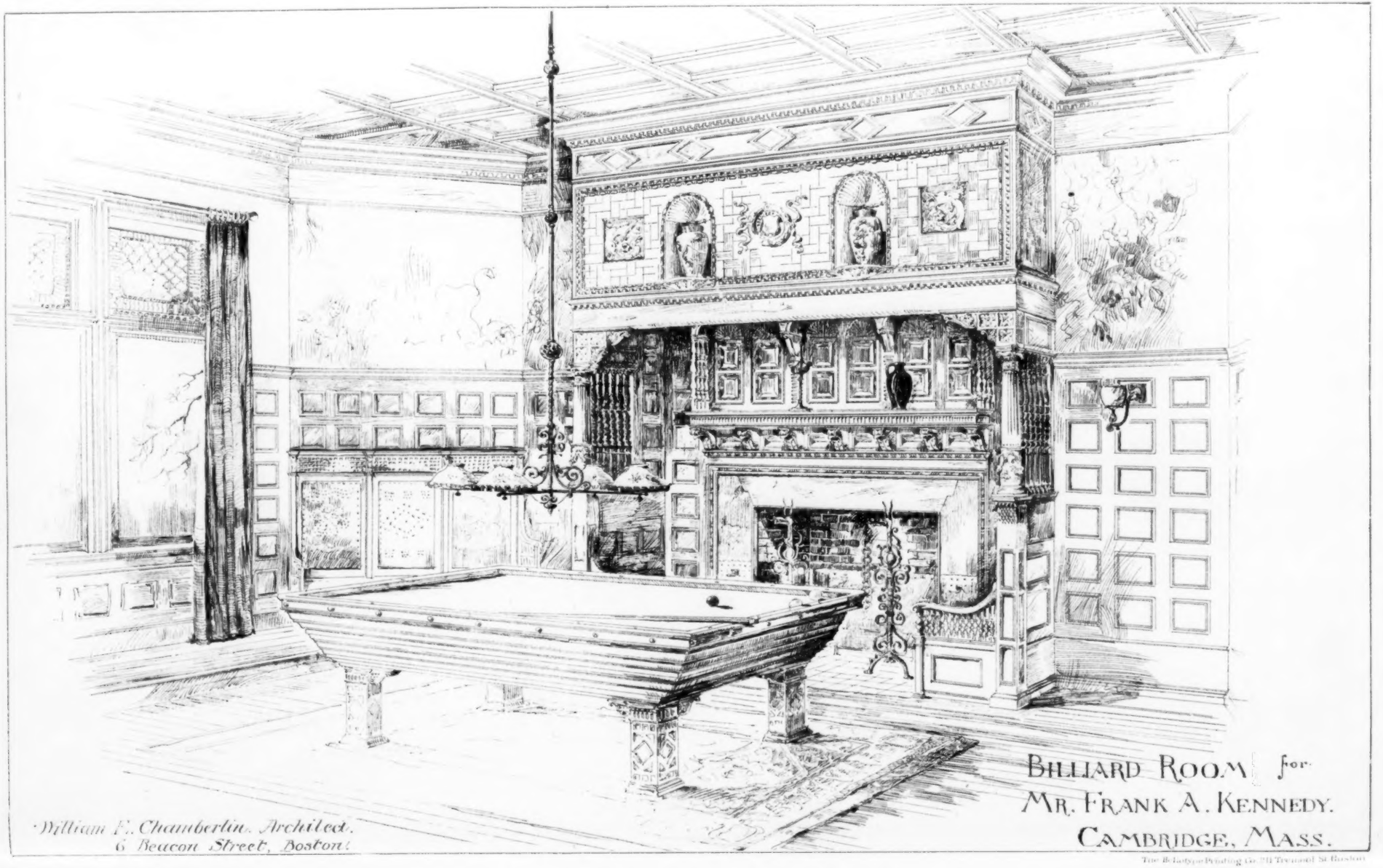
American Architect and Building News, Oct. 15 1884 No. 460



BILLIARD ROOM for
MR. FRANK A. KENNEDY.
CAMBRIDGE, MASS.

William F. Chamberlin. Architect.
6 Beacon Street, Boston.

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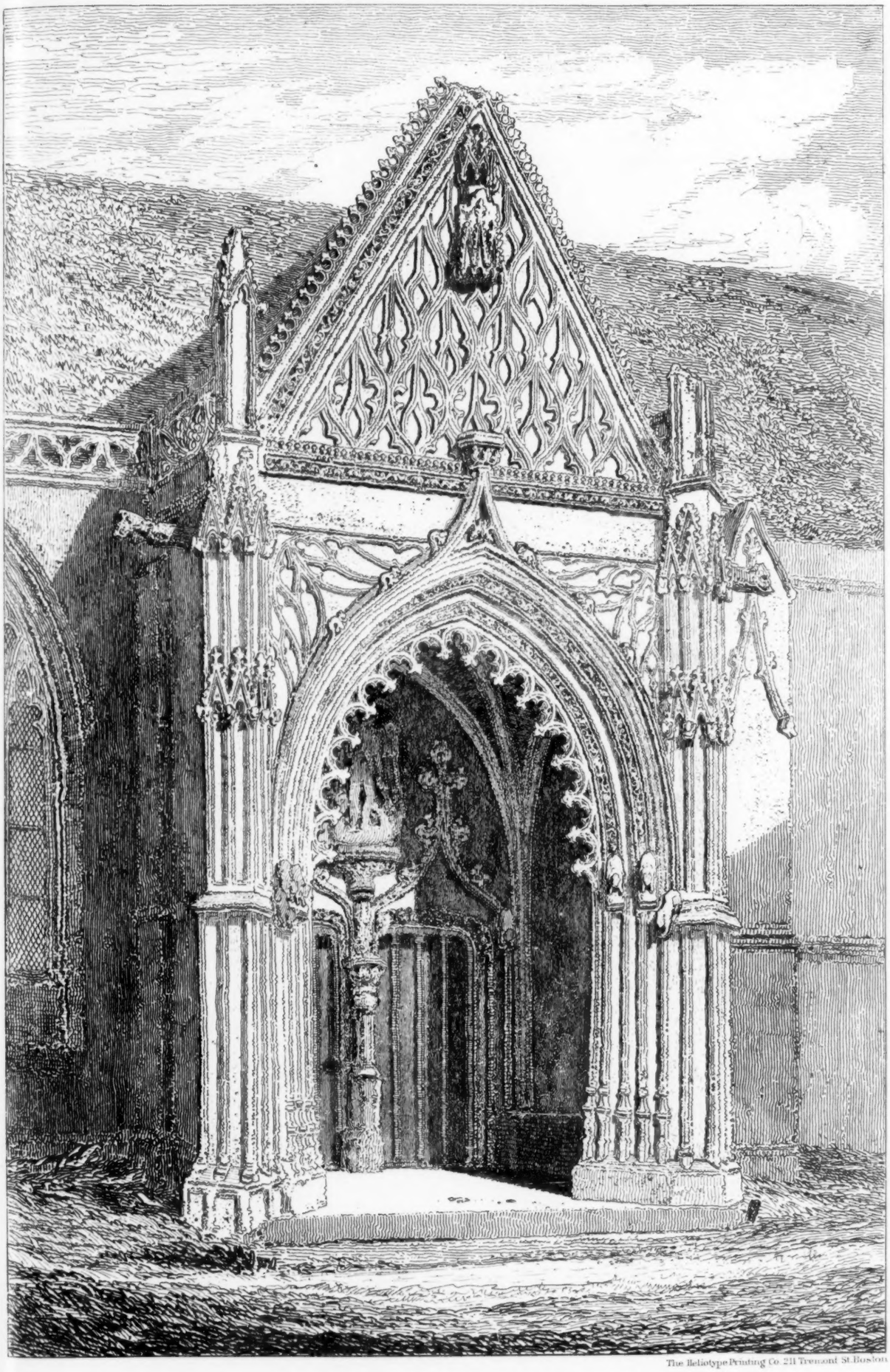

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CHURCH OF St MICHEL DE VAUCELLES, CAEN.

No. 16 Porch.

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PHOTO-CAUSTIC HELIOTYPE PRINTING CO. BOSTON

Bay of Amalfi, Italy.
from the Monastery of the Capucins.

amount, we did not very energetically enter into the question of the price we could obtain for it. We were quite satisfied to hand it over to a large firm of artificial-manure manufacturers, who took all we made at £5 per ton without any reduction for carriage. When our output rose to twenty and twenty-five tons per week, this firm found the quantity larger than they could deal with, and we accepted a temporary reduction of price to £4 a ton. During the last two months, however, we have been making efforts to obtain other markets and a better price, and we found no difficulty in getting £5 a ton; in fact, we have been able to get as much as £7 10*s*. We also find that the Corporation of Warrington can command a steady price of £6 10*s*. per ton for exactly the same material.

THE ILLUSTRATIONS.

CHURCH OF ST. MICHEL DE VAUCELLES AT CAEN,[1] (CENTRAL TOWER AND NORTH PORCH).

THE Abbé De la Rue, in his excellent publication upon the town of Caen, does not furnish the satisfactory information which might have been hoped, relative to the date of the erection of the Church of St. Michel, in the suburbs of Vaucelles. He contents himself with observing, that it is a work of different eras; that the tower and its supporting pillars belong to a primitive church, of which no account remains; that a part of the nave may be seen, from the circular form of the arches having been obviously altered into pointed, to have belonged to the same church; that the choir was raised and increased during the sixteenth century; that the aisles are partly of the same century, and partly of the preceding; and that the other portion of the nave and the new tower are productions of our own days.

In all this there is nothing definite; and, unfortunately our knowledge of Norman architecture is not such as will justify us in attempting to fix precise eras to the different specimens which are left us of it. As far, however, as it may be allowed to judge from corresponding edifices, Mr. Turner seems correct in his opinion, that "the circular-headed arches in the short, square tower, and in a small, round turret which is attached to it are early Norman." He subjoins the observation, that "they are remarkable for their proportions, being as long and as narrow as the lancet-windows of the following era." The conical stone-roofed pyramid is, with the exception of its lucarne windows, most probably of the same date. With regard to the porch, its general resemblance in style to the southern porch of the Church of St. Ouen, and its having, like that, its inner archivolt fringed with pendent trefoils, are circumstances that have likewise been pointed out in the work just referred to. Both porches may probably be of nearly the same date, the latter part of the fourteenth, or beginning of the fifteenth century. Caen, but a short time before the Revolution, contained another very similar architectural specimen in the western portal of the Church of St. Sauveur du Marché, now replaced by an entrance altogether modern. The nave of the Church of St. Sauveur was built, according to De la Rue, in the fourteenth century; and it may fairly be inferred, that the portal was also of the same date; but this porch wanted the pendent trefoils, and was altogether less ornamental than that of St. Michel, as the latter was then at Rouen. Both those at Caen, however, agreed in the wall above the arch rising into a triangular gable, covered with waving tracery, a very peculiar, and a very beautiful style of decoration.

A DESIGN FOR A BATTLE-FIELD MEMORIAL, LEXINGTON, MASS. MR. GEO. R. TOLMAN, ARCHITECT, BOSTON, MASS.

AT a town meeting held in Lexington, November 6, 1883, a committee was appointed to consider and report at the March meeting, on the subject of marking the principal sites of historic interest in the town. March 3, 1884, the town heard and accepted the committee's report, and referred the subject back to them, with full powers to carry out the recommendations suggested; also granting an appropriation to cover the expense. One of the sites to be marked is the slope, near the present High-School, where Earl Percy planted one of his field-pieces early in the afternoon of April 19, 1775.

The committee in consultation with the architect decided upon a design by him of a stone cannon, roughly suggested.

The accompanying print is from a pen-and-ink drawing made by him from his submitted design, which was in water-color. In the design the motive was to suggest only, without attempting a reproduction of a field-piece. The weight of the memorial is about five-and-one-half tons, the gun being about six feet long.

It was acceptably executed in Concord granite, by Mr. R. K. Carpenter, at his yard in West Medford, Mass.

It will be placed in position about the middle of October.

BILLIARD-ROOM FOR F. A. KENNEDY, ESQ., CAMBRIDGE, MASS. MR. W. E. CHAMBERLIN, ARCHITECT, BOSTON, MASS.

STABLE AT EAST OAKLAND, CAL. MR. CLINTON DAY, ARCHITECT, BERKELEY, CAL.

THE BAY OF AMALFI, ITALY, FROM THE MONASTERY OF THE CAPUCINS.

[1] From Cotman's "*Antiquities of Normandy*."

THE CATHEDRAL, MAYENCE, GERMANY.

A DESCRIPTION of this building may be found in the *American Architect* for December 6, 1879, page 180.

HELPS.[1]

SEVERAL years ago, we passed an exceedingly pleasant evening at the house of an English architect, who,— apart from his disdain for America, its scenery, its architecture, and its inhabitants, a disdain so intense that he then avowed his intention never to visit this country, though he is a constant traveller in the older world — was a most entertaining and agreeable host, and with the simplicity of a man who is confident of his powers exhibited to us and the other guests of the evening his collection of sketches,— a vast array, for he is a most industrious and rapid worker, and, moreover, an adept in the use of the camera lucida, which he does not hesitate to use both for the sake of saving time, and of securing perfect accuracy in sketches which are likely to be of professional value to him.

But what struck us more than the amount of work or the excellence of it was the perfection with which the collection was arranged and classified. A lawyer's docket was nothing to the methodical system here exhibited before us. A guest while examining a sketch had but to raise a question whether there was or was not a similarity between its subject and some other building, when the host would pull open one of his neat little drawers, and in a moment produce the proof wanted; if it was n't a sketch, it was a photograph or an engraving. This evening visit gave us a new idea as to what an architect's working-library should be, and showed us how little practically useful are the shelves full of handsomely bound volumes, which, we confess, had up to that time been the ideal library which we dreamed of and hoped for. Observation has since shown that this sort of library is gaining in favor with the profession, and topical scrap-books and portfolios in many offices take the place of the attractive red morocco and gilt bindings. The true way to form an architectural library would be, of course, to buy all illustrated books in duplicate, one volume to be kept for reference with all its glory of red and gold intact, and the other to be ruthlessly disembowelled and its viscera distributed under their appropriate classes; but, alas! who can afford such a library as this?

We dare say our readers have wondered what induced us to adopt the seemingly erratic custom of prefixing to each printed article an initial-cut, which, as often as not, has no association with the article it introduces. But we hope they have felt that they added interest to the page, and made it "easier reading"— if in no other way, then by making it shorter — and that they have found in these miscellaneous cuts the same sort of profit and interest that comes from turning over a fellow-worker's pocket sketch-book. And we hope, too, that not a few may have repined that so much good material so many useful hints and *motifs* were buried up and lost in a mass of printed matter where it was not easy to find them, as the text with which they were allied would afterwards afford no clue to their whereabouts.

It was always our intention that all this good material should not fail of its full usefulness, but should sooner or later see the light again in more convenient form; and at length we have looked over our accumulation and have selected enough from it to make, both in quantity and quality, an architectural miscellany which we believe many designers will be glad to have, and which we hope will meet with such acceptance that this issue will prove to be simply the first of a series of similar ones; for herein lies the real value of the undertaking.

The cuts we have selected have been arranged by subjects, printed on extra heavy and strong paper, and enclosed, loose, in a paper envelope, so that they may not only be most convenient for immediate office use, but so that a future re-classification may be possible, as other issues are put forth which may contain sheets treating the same subjects as are included in the first issue: so in this instance, at least, an architect need not hesitate to arrange his plates according to his own idea of greatest utility through his unwillingness to do violence to a "fine binding."

Looked at as we would look at a publication with whose being we had had nothing to do, we cannot but say that we are surprised at what has been accomplished. We have here a work of no mean artistic pretension, for in the couple of dozen or so sheets containing, perhaps, one hundred and seventy-five cuts, we have specimens of the handiwork of many skilful sketchers, a fact which lends a sparkle to the page, and creates a sustained interest, which one does not feel on turning over page after page of one man's work, however cunning a worker he may be. Some of the sheets taken as a whole are exceedingly "taking" at first sight, and closer inspection of the individual cuts declares the reason: for instance Plate 10, which in spite of its lugubrious title, "Tombs and Funeral Monuments," has altogether the most jocund air of any in the collection. Others evidently await the advent of future issues to acquire their full value.

[1] *Picturesque Sketches*: comprising Architectural Sculpture, Statues, Monuments, Tombs, Fountains, Capitals, Cathedrals, Iron-work, Details of Ornament, etc. Boston: James R. Osgood & Co., 1885. Price, $1.50.

SUBTERRANEAN RAILWAYS IN PARIS AND IN LONDON.

THE pressure of population on the channels of communication, of which we have so much experience in London, is becoming intolerable in Paris. In 1881 a population of 2,243,000 persons was contained in 77,000 houses, over an area of thirty square miles, in that city. In the same year the "Greater London" of the Registrar-General contained 4,764,312 inhabitants, occupying 645,818 houses, built over an area of 697 square miles. The total passenger traffic of Paris is returned at 340,000,000 persons in the year, or about 932,000 per day, of whom about thirty-four per cent were carried by tramways, thirty-one per cent by omnibuses, thirty per cent by cabs and other vehicles, and five per cent by steamboats. In London the total amount of traffic is not accessible; but 384,000 pedestrians and 75,000 vehicles pass daily over the metropolitan bridges; and the traffic on three of the metropolitan railways — viz., the Metropolitan, the Metropolitan District, and the North London — amounted in 1881 to 373,000 passengers per diem. This total takes no account of the daily influx of passengers by railway at Victoria, Paddington, Euston, St. Pancras, King's Cross, Ludgate Hill, and the Eastern Counties Termini, or of those who, arriving at the London Bridge or the Waterloo Stations, do not cross the river; or, again, of the dense traffic on the high-level line from Charing Cross to Cannon Street. The rate of travelling in Paris, according to the previous statement, is rather more than 150 journeys per inhabitant per annum. Going and returning, then, without counting pedestrians, each Parisian will only take an enumerated trip by vehicle three times in a fortnight. At the same rate the London journeys by railway or other vehicle would amount to upwards of 711,000,000 passenger trips per annum, or nearly 2,000,000 per diem, without counting pedestrians.

Whether we regard London, Paris, or any other great centre of population, it becomes apparent that an enormous amount of inconvenience and loss of time is due to the abandonment of the ancient Roman method, borrowed from the camp, of building cities on the plan of straight thoroughfares, crossing each other at right-angles; a return to which excellent method has been accomplished by the builders of the rapidly-growing cities of the United States. The actual loss of that time which has a direct money value that is incurred by the want of a direct thoroughfare, either for locomotives or for common road vehicles, from the northern to the southern railway stations in London, must be something very serious indeed. In Paris there exists a similar inconvenience, although, of course, on a smaller scale, which it is now proposed to remedy. Three lines of subterranean railway are projected for this purpose. One will connect the Chemin de Fer de l'Ouest with the Lyons Station, with a branch to the Arc de Triomphe, and another, by the Trocadéro, the Mount Parnasse, and the Orleans Stations to the Sceaux Station. Lastly a line is to run north and south, inside the existing Ceinture Railway, passing the Nord and Est Stations, the Bourse, and the Halles Centrales, to the Sceaux Station.

The total length of the line which it is thus proposed to construct is 23.25 miles, for which the estimate is £5,720,000, or about £246,450 per mile. The average gross revenue of the tramways along the boulevards and from the Place de l'Etoile to La Villette, together with that of the three-horse omnibus service along the Boulevards de la Madeleine and le Bastide, is £26,833 per mile per annum. If the new line provide for the traffic *à grande vitesse* only, as will probably be the case, and if the traffic secured by the new line yields an equal revenue per mile to that above cited, there can be little doubt that the undertaking would pay six and one-half per cent on the capital; while, if the amount of the omnibus traffic cited be taken as a measure of revenue, the return would be between nine and ten per cent on the capital, assuming the estimate not to be exceeded.

It may be instructive to compare this outcome with that of the railways through London. Unfortunately, the accounts of the Charing Cross and Cannon Street line, like those of the Ceinture Railway in Paris, as involving operations on the part of more than one company, are not distinguished in the annual returns. But we can take the average of the statistical features of the North London, the Metropolitan, and the Metropolitan District railways, which form an aggregate length of fifty-two miles. Of these, the cost per mile, at the end of 1883, averaged £416,538. The gross revenue was £30,047 per mile per annum, and the working expenses came to £14,400 per mile per annum. The resulting earning on capital is only at the rate of 3.52 per cent per annum; but this net return on traffic is reduced by the omnibus character of the North London traffic, which, following the usual law in such cases, costs fifty-one per cent income to work, while the two passenger lines are worked at forty-two per cent of gross income. On the North London line, each servant of the company only earns £227 per annum, while on the Metropolitan District the mean earning per servant is £348, and on the Metropolitan £395. On the Ceinture line (*Rive-droite*), the earning of each servant of the companies engaged averages £358 per annum; while the average earning per servant on the Metropolitan and Metropolitan District lines, taken together, is £375. It thus appears that it is safe to estimate the working costs of the new Parisian lines as not likely to exceed forty per cent of the gross income, while the capital cost is only about five-eighths of that of the three London lines.

It may be hoped that a consideration of these figures may tend to stimulate the attention of the metropolitan authorities to the construction of a better line of communication from north to south in London. The enormous cost of a line through London itself is very formidable, and can hardly be encountered by the promoters of any new line, taken *per se*. In 1878, the cost of the Metropolitan Railway stood at £639,000 per mile, and that of the Metropolitan District Railway at £680,000 per mile. The distances then open were fourteen miles and nine miles respectively, and the extension of the lines to cover distances of twenty-two miles and eighteen miles has reduced the enormous mileage cost, while at the same time it has fed the traffic. At present, however, while regarding the possible development of electric traction, it perhaps is hardly the moment for asking the public to find two-thirds of a million per mile in order to link Euston and Charing Cross by railway. As to a well laid out and practical street, however, a hint may be taken from the returns of the traffic of the Paris omnibuses. Let us give one pair of facts alone. The earning of each passenger-carriage on the Metropolitan District Railway in 1879 was £2,028. The earnings of each three-horse omnibus running along the Boulevards de la Madeleine and le Bastide since 1883 amounts to £2,272 per annum. It is true that it costs nearly three and a half times as much to move an equal weight for a mile over the road as it does over the railway; but, on the other hand, the interest of money required is eight times as much in the latter case as in the former. Without expressing an opinion as to what is best, there can be no doubt that a wide, straight, well-paved street, served by a thoroughly well-ordered horse service, would, at the same time, be a great benefit to London and a highly-remunerative enterprise to the purveyors of this mode of communication. In fact, the figures above cited, which are the result of a long series of observations, explains how it is that the dividend of the London General Omnibus Company is something more than twice the net earning on capital of the Metropolitan Railways.— *The Builder.*

THE SIZE OF BRICKS.

THE best method of developing the art of building in brick has occupied the attention of architects and engineers in Switzerland for some years, and with this view it has been determined to attempt to fix a certain standard size of brick, and a report was presented to the Swiss Society of Architects and Engineers, in which the dimensions recommended were 9.84″ x 4.72″ x 2.36″ As, however, these dimensions were not agreed to by all sections of the Society, a special Federal commission was appointed to inquire into the subject. A report was presented to the General Assembly of Cantonal Delegates at Berne, by M. Favod. The author, first of all, gives a brief account of the bricks that were used by the Assyrians, Egyptians and other ancient peoples. He then gives tables of the dimensions of the bricks that were used from remote periods up to the seventeenth century, and of those in use at the present day in Italy, France, England, Belgium, Austria, Germany and Switzerland. From these tables he shows that the standard size should be between the limits 4.45″ long, 4.43″ broad, and 1.97″ or 2.56″ or 2.76″ thick, and 11.63″ long, 5.12″ wide, and 1.97″ or 2.56″ or 2.76″ thick; or, taking a mean, the size should be 9.84″ x 4.72″ x 2.36″. This size is made at the present time, as is also that of 9.84″ x 4.72″ x 2.76″.

The author is greatly in favor of the thicker brick, and a great deal of the paper is taken up with a discussion of the possibility of properly burning it, many of the Swiss brick-makers having stated that they cannot burn bricks having a greater thickness than 2.36″. In reference to the thicker bricks, he remarks: —

1. That, the other dimensions remaining the same, the resistance increases with the thickness.

2. There is, perhaps, rather more difficulty in drying a thick brick, but care in mixing the beds of clay, the addition of sand, gradual drying, etc., will readily get over it.

3. In burning the bricks must be carefully placed in the kilns, as the gas will follow the shortest route to the outlet. The bricks must be arranged so as to oppose obstacles to its escape in this direction, while facilitating its passage by the longer route. The bricks, after being dried in the sheds, should be further dried by hot air from the kilns before being burnt. All apertures by which the air could pass into the kilns must be carefully closed, and the cooling of the bricks must be gradual.

4. When color is of importance, attention must be paid to the fuel.

Coals of inferior quality frequently contain extraneous matter which is deleterious to good color, and also the weathering qualities of the bricks, and is sometimes the cause of efflorescence.

5. With the same material there will be a better output of first-class bricks with a 2.76″ than a 2.36″ thickness, because vitrification does not begin so soon. Of course the best quality can not be obtained from clays which are very chalky, earthy or sandy, but, with careful manipulation, very fair bricks may be made from very moderately good earth.

The author conducted some experiments at the Horn brick-fields of M. Bourry, where the bricks are made by machinery and burnt in Hoffman kilns. These experiments were performed with eight varieties of earth: three blue, three yellow, one sandy and one earthy. Bricks were made from each variety separately, and also from mixtures of different kinds. Their dimensions were 9.45″ x 4.53″ x 2.76″. They were dried under different conditions, according to their kind, and burnt carefully in kilns with other bricks. The result was that each different clay and each mixture produced bricks of different colors, but all well burnt and sound. With regard to the question of price, of course, if the manufacturer sells his bricks by the thousand without reference to size, the smaller they are the better for him. The contractor, too, is apt to prefer small bricks, because with them he uses more mortar, which costs him less: but, on the other hand, he requires more bricks per cubic yard (the number of bricks of different sizes in a cubic metre of work are given), and there is more labor in setting them, so that what he gains in one way he loses in another.

In regard to the quantity of mortar, Dr. Boehme's experiments at Berlin in 1875 proved that no more mortar than was actually necessary to keep the course horizontal and effect the cohesion of the bricks (for which purpose joints of .4″ thick are ample) should be used, as, whether the mortar becomes more or less hard than the bricks, the result is in either case to reduce the strength of the work. Experiments made with blocks of twenty sound bricks, one set of blocks cemented with various kinds of mortar and cement (the joints .4″ thick), another set consisting of bricks laid dry, and surrounded with cement simply to keep them together, gave as mean resistences to compression: for the first set, 1,618 pounds per square inch to cause splitting, 1,934 pounds for the destruction of the bricks; and for the second set, 2,202 pounds per square inch to cause splitting, and 2,291 pounds per square inch for destruction, showing that the dry bricks gave a mean resistance of one-third more than those set with mortar before splitting, and one-fifth more before destruction. The author therefore concludes that, to secure the greatest strength, thick bricks with a minimum of mortar should be used. The author suggests that the price of bricks per thousand should vary according to the number required per cubic metre of work, so that the manufacturer may be paid according to the size of the bricks. Finally, he recommends that the standard brick should have the dimensions 9.84″ x 4.72″ x 2.36″. — *Exchange.*

THE PLUMBERS AND DEALERS.

NEW YORK, September 19, 1884.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Gentlemen, — We enclose our circular to the Master Plumbers, addressed to them on the question of "Protection" now agitating their trade. As the circular contains some points that may be interesting to architects, and as we are old advertisers in your paper, we take the liberty of asking you to publish it in your next issue.

Very truly yours, MYERS SANITARY DEPOT.

NEW YORK, September 15, 1884.

TO THE MASTER PLUMBERS: —

We have been requested from several sources to express our views upon the matters now under discussion between the plumbers and the manufacturers of plumbing supplies. It seems to be chiefly due to there being two sets of resolutions one of them National, and the other Local. At the combination meeting of dealers and plumbers, after the reading of the National resolutions by Mr. Andrew Young, all of the dealers present expressed their views, and Mr. Young, with the plumbers present, could not but have thought from remarks made by the dealers that their fondest hopes were about to be realized. Later on at this meeting, the local resolutions emenating from the New York and Brooklyn Associations were submitted, and shortly after the meeting adjourned with the understanding that the dealers would hold a separate meeting. A few days later at the dealers meeting, the local resolutions which were supposed to compel all plumbers to become members of an association before dealers could sell to them were presented. The framers of the letter addressed to Mr. A. Young, President of the National Association of Master Plumbers, had these local resolutions appended to the reply which they had prepared, we, in common with others, supposing these resolutions to be the National resolutions, signed the reply that was addressed to the President of the National Association. We have since discovered our error, and having read the National resolutions we find that we can heartily approve of them, and believe that if they should be accepted by the dealers, the consumers of our goods, and all concerned would alike be benefited.

Some years since, we sold a large bill of goods to a builder, who hired a master-plumber to put the material into the building; after the completion of the work, and a comparison was made of prices with former estimates, the builder found he had lost money, and he can never again be induced to buy his own plumbing material: this is the experience of the large builder as well as the individual house owner. It is our opinion that builders, as well as individuals, will find it to their own interest to always select a competent plumber, and allow him to buy the goods for them, then the responsibility for the proper working of the material rests with the plumber, but if the individual buys the goods, and hires the plumber to put them in, and if there is anything unsatisfactory in the working of them, a contention is apt to arise as to the responsibility, and the individual if he has been so lucky as to have obtained a discount on his purchases, finds that his extras have cost him more than the discount he thought he had saved.

We very much deprecate the spirit of the communication dated September 3d, addressed to Architects by the Chairman and Secretary of the Dealers meeting, we had no knowledge of this letter until it appeared in public print, we are not in sympathy with those who believe that this move is "an apparent effort to combine for the purpose of extorting from the public." It is the manufacturer who fixes the prices, and we are not aware that the plumber has asked us to raise our prices.

And we further deprecate the terms "communistic" and "trades-unionism," which the architects are asked to help stamp out. In all our dealings with the plumbers, we fail to discover anything of the kind. Very truly yours, MYERS SANITARY DEPOT.

A. G. MYERS, *President.*

[We publish this document as we are requested, but we think that the final scene of this comedy of errors will be brought on the stage more speedily if both parties will let printer's ink alone. The quarrel is obviously one which should be settled by a reference to a joint committee. — EDS. AMERICAN ARCHITECT.]

THE BROOKLYN HALL-OF-RECORDS COMPETITION.

NEW YORK, September 17, 1884.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — I enclose the circular sent out by the Kings County Board of Supervisors, concerning the competition which closes to-morrow, for the designing of the new Hall of Records for that County. It is in certain respects a model, I think, of what ought not to be done in arranging such a competition. I also enclose a copy of a letter I mail to that Board to-day, regretting the lateness both of that letter and of this; though I could not in any case have really hoped that such a letter would effect a change in the published regulations of the competition. Is it not strange and sad that for so important a building, so near the very metropolis and centre both of wealth and of architectural affairs in this country, such an extraordinary programme should be officially promulgated.

You are at liberty to do anything you please with these enclosures except to consign them to the waste-basket. If they are of no use to you will you kindly return them by mail to me? I enclose the necessary stamps, and sign myself,

Yours very truly, SUBSCRIBER.

NEW YORK, September 16, 1884.

TO THE SPECIAL COMMITTEE ON HALL OF RECORDS, BROOKLYN, KINGS COUNTY, N. Y.: —

Gentlemen, — Early last August, in response to an advertisement sent me by a friend, I applied to the Clerk of the Board of Supervisors of Kings County, for a copy of the conditions regulating the proposed competition for the design of the new Hall of Records of that County. In due time these were forwarded me by mail, and I at once examined them to see what inducements they held out to intending competitors. I take the liberty at this late date, on the eve of the closing of your competition, and presumably on the eve of your decision thereon, to lay before you the reasons which led me, and I doubt not many others to decide against engaging in this competition; and I greatly regret that a press of other duties has prevented my addressing you earlier.

Few will deny that the object of an architectural competition is, or should be, to secure the best possible design, by inviting to friendly rivalry through the stimulus of prizes, the largest number of competitors possible, thus making possible a choice from the greatest variety of designs. To this end, few will venture to deny the following conditions to be essential: —

1st. Prizes to be sufficiently large to attract the efforts of even distinguished and prosperous architects.

2d. The drawings and labor required should be reduced to a minimum; for evidently, the smaller the amount required to be risked, the greater will be the number of competent architects willing to take that risk.

3d. The requirements of the new building, whether as to form, size, material, or character, should be given in the clearest manner, either by letter-press, figures, or diagrams, or all three.

4th. The competitors should know who is to judge their work, and the jury selected for this important task, especially in the case of a building of public importance should be of conspicuous ability, both architectural and practical, and of unchallenged fair-mindedness.

5th. There should be some guaranty that every competitor will receive back either his drawings, or a fair equivalent therefor.

The "Rules and Regulations" of the present competition, whatever may be said of the value of the prizes, fail utterly to satisfy the last four conditions.

Besides the eight or nine drawings called for, your circular requires detailed specifications and estimates, and a study of points which should never be obtruded into a competition like the present, and the preparation of which involves labor and expense, which not many architects of high standing, nor many unblessed with extensive leisure, would be willing to bestow for the mere chance of a prize. But supposing the architect to assume this risk, he is then confronted with the necessity of measuring the present offices of County Clerk, Surrogate, etc., or procuring, as best he may, plans of the same as the basis of his work. This is impossible for architects at a distance, inconvenient for those near by, and wholly needless, since a simple statement in your circular of the areas required would have been all that was necessary.

But fourthly, your circular says nothing about the jury of award; and even presuming it to be your own honorable Board, it is no derogation to your honor and fair-mindedness to inquire what special qualifications your committee possesses for the decision of so delicate and important a question of purely architectural merit.

And finally, at the close of your circular, the competitor learns to his amazement, that if successful in winning a prize, his carefully wrought design (worth two-and-one-half per cent of $250,000, or $6,250, if adopted integrally, and of proportionate value if used in part) is to *remain the property of the County:* — and that the Board of Supervisors reserve the right to use any and all of the prize-designs, wholly, or in part, in erecting the building, without further compensation to, or consultation with, the designers! They thus thriftily secure for one thousand dollars five designs, to procure any one of which at the regular rates of compensation adopted by reputable practice, alike in France, England, and the United States, would cost them over $6,000. And this, with no guaranty that the architects' ideas shall be carried out as he conceived them, or in a manner creditable to him, and in the face of countless legal decisions, affirming as a principle the architect's ownership in his drawings, whether used in the erection of a building or not, *unless expressly stipulated to the contrary*, which stipulation truly "to the contrary" of all good practice every competitor for these prizes is compelled to agree to.

I am convinced, gentlemen of the committee, that these regulations were drawn up without realization of their unfortunate bearing upon the profession, and good architectural practice; and I venture to express the hope that the erection of so important a building as this Hall of Records shall not be awarded upon such unsatisfactory conditions of competition. The importance and dignity of Kings County should call to the task of such a design, the very highest order of ability. This, I am afraid — knowing not a single one of the present competitors, and in the hope that my fears are groundless — the terms of the just closing competition will hardly have secured; and lest by this statement I seem to egotistically refer to my own refraining from the competition, I beg to add: that whatever might have been the conditions, I should in any case have soon found myself too busy to engage in it, owing to the same press of work which has delayed this letter. I have therefore written with no personal feeling, but from devotion to the interests and honor of a profession, of which I am one of the humblest and least known members; and beg to remain ever, Yours respectfully, Alfred D. F. Hamlin.

THE AREA OF HEATING-SURFACE.

Winnipeg, September 25, 1884.

To the Editors of the American Architect: —

Dear Sirs, — In a number of your journal dated June 2d, 1883, page 257, it is stated, that "the usual rule for estimating the heating surface of the boiler must be one-tenth that of the radiating surfaces." By this rule a building containing 30,000 cubic feet of air would only require 40 square feet of heating surface in the boiler, this I find far too small; would you be kind enough to throw a little more light on the subject, and say what you consider the right amount of heating surface required in a boiler to heat the air space mentioned.

Yours respectfully, J. Greenfield.

[The rule of one square foot heating surface to ten of radiating surface is the common one in the Northern States for direct radiation in ordinary buildings. Where a fresh-air supply is admitted, to be heated by the steam and afterwards wasted by ventilation, of course both radiating and heating surface must be increased. Much also depends upon the character of the boiler and the care given it, and much, of course, on the proper arrangements of pipes to give sufficient circulation. If our correspondent has any specific case in mind, we would be glad to have further details, and will give a careful opinion. — Eds. American Architect.]

NOTES AND CLIPPINGS.

A New Diving-Bell. — MM. Imbert freres, of St. Chamond, have produced a very original diving-bell, which they have named "*Neptune.*" It reminds one of Jules Verne's "*Nautilus,*" and is admirably adapted to its purpose, scientific observations at sea. In form the apparatus resembles a huge bottle. It is seven metres 80 inches in height, and three metres in diameter. Its sides and neck consist of two steel plates, twelve metres thick, firmly riveted and bolted together. The neck contains a spiral staircase leading to the three superimposed chambers below, and is closed on the top by a steel cover through which the tubing of a pump used within for sinking or raising the diving-bell passes to the surface of the water. The cover itself is bordered with India-rubber, to render the bell perfectly water-tight. The compartments are separated from each other by steel sheets twenty-five centimetres in thickness, and supported by diminutive columns and angles. The upper chamber is furnished with reservoirs for compressed air, telegraphic and telephonic apparatus, electrical piles, etc. Five eye-holes, filled with strong glass, enable the engineers to look about on all sides. The middle chamber is furnished with fourteen eye-holes, with lenses for taking observations, and in the centre is a large lens, eighty centimetres in diameter, to inspect the sea bottom. The lower chamber contains the lighting and ballasting apparatus. The electrical machinery for projecting a light in all directions fulfils a two-fold purpose, for the electrical rays will undoubtedly attract the fish. The bell may be let down to a depth of two hundred metres by filling the ballasting chamber with water, which is pumped out and filled with air when the diver pleases. — *Galignani's Messenger.*

Japanese Fans. — Some notion of the quantity of Japanese fans used in Europe may be obtained from the official returns. During last year Hiôgo exported 2,647,966 fans; Osaka, 166,645 fans; and Kanagawa, 1,919,840 fans, or nearly four millions in all. There were 132,110 umbrellas and 16,299 screens exported from two of the ports, and the figures do not represent the entire quantity sent abroad. The exports of bronze, furniture and porcelain are also remarkable. Looking at the extent of the trade it is not surprising that a Japanese company is constructing an iron pier at Hiôgo, which is 450 feet long, at a cost of $100,000, and four warehouses as bonding stores, each measuring 42′ x 102′. — *The Architect.*

Cubic Space of Air in Stables. — Authorities on ventilation observe that a man makes twenty inspirations of air every minute, each inspiration being of a volume equal to 40 cubic inches, so that he requires 800 cubic inches per minute of fresh air to supply him with the necessary health-giving pabulum for his lungs. Each expiration unfits for breathing twice the bulk of fresh air; that is, the 800 cubic inches expired per minute contaminates 1,600 cubic inches of fresh air, or nearly a cubic foot. Hence, in round numbers, a man requires a cubic foot of fresh air per minute, or 60 cubic feet per hour. Thus, to give this amount of air-space in an apartment it requires a room of 600 cubic feet per individual. A horse or cow is said to have six times the breathing capacity of a man, so that it will require 360 cubic feet per hour, or 3,600 cubical feet of space. If every animal requires 1,000 cubic feet per hour, it follows that the dimensions of a stable with stalls 6 feet 6 inches wide, 9 feet long, with a passage behind of 6 feet, and having a height of 10 feet will afford this amount of space to each horse. The mode of ventilating a stable has long been a vexed question, though there is a very simple means at the disposal of the builder. The open roof is acknowledged on all hands as the most desirable; it admits of a ridge louvre or ventilator extending the whole length of roof. The ridge ventilation system was strongly recommended by the commissioners on barrack and hospital improvements, who specially reported on cavalry stables. They also recommended air-bricks, 9″ x 9″, introduced in the walls along the eaves, with their apertures arranged that the currents of air will flow in the direction of the ridge. A window to each stall on the swing principle, and with a series of inlets below, about six inches above the floor, one to each stall, give all that is required to produce a healthful stable. — *Building News.*

The French and their Clocks. — Watch-makers in dull quarters of Paris derive good fixed incomes from being employed to attend weekly to the chimney-clocks of prosperous bourgeois. Punctuality is not a French virtue, and half an hour's law is given at private dinner-parties to those invited. At public dinners the guests sit down at about an hour after the time specified in the cards of invitation. Railway-clocks on the façades of termini are five minutes in advance of those inside. An appointment is hardly ever punctually kept. Gambetta was one of the rare Frenchmen who are always to the minute. But his friend, M. Spuller, sometimes gives himself a couple of hours' margin. M. Clemenceau piques himself on the observance of social duties, and is in this respect a pattern radical; but when he makes an appointment he is not vexed if the person he is to meet is half an hour late. M. Barthelemy St.-Hilaire and De Lesseps keep time by marine watches purchased abroad. I know a Deputy who piques himself on his observance of social duties. One day I had an appointment with him for one o'clock; he came after two. When I ventured to reproach him with being so late, his answer was: "I am very sorry you had to wait so long, but why did you come so early?" The way in France is for each of the parties who have made a rendezvous, unless as duellists, to give the other half an hour's margin, which, being taken on both sides, makes in all an hour. This system of addition is analogous to what a Californian said of a big tree: "it grew so high that it took two men and a boy to see to the top." The Prussians have been branded, since 1870–71, with the name of *Voleurs de Pendules.* They were especially tempted by the pinchbeck-looking galvano-plastic articles which are usually protected from the air by glass shades. Timepieces of a severe style, and in real bronze, were not so often looted. Prince Bismarck took a fancy to a dark bronze clock, which stood in his sitting-room at Versailles on an elevated bracket. It represented the fall of Lucifer. The defeated archangel was more Byronic than Miltonic. When negotiating the preliminaries of peace, M. Thiers was placed at the table opposite this timepiece. He was nervous and fatigued, and though not habitually superstitious, felt very uncomfortable whenever his eye caught the sardonic visage of Lucifer. Bismarck secretly noticed his discomfort, and enjoyed it. At last M. Thiers vowed that he could no longer endure the irritation which the sinister-looking figure caused him, and asked to be allowed to change places with the Chancellor. He would have been glad if Lucifer had been taken out of the room. The proprietress of the house was asked by Bismarck to let him have the clock at a valuation. He wished to keep it as a souvenir of the event which took place under its shadow. It was reluctantly sold to him. In speaking of Thiers's nervous fear that the fallen archangel on the timepiece augured no good to France, the German Chancellor said: "He reminded me of what the Princess Palatine said of the Duc d'Orleans (the Regent), her son: "*Il ne craint pas Dieu, mais il a une peur blanche du diable.*" — *London Daily News.*

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[*Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.*]

BUILDING PATENTS.

[*Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.*]

306,049. DEVICE FOR OPERATING ELEVATOR-DOORS. — Cyrus W. Baldwin, Chicago, Ill.

306,052. BENCH-CLAMP.—John Birch, Dayton, O.

306,053. HYDRAULIC MAIN FOR GAS-APPARATUS. — Arther E. Boardman, Macon, Ga.

306,072. CISTERN ATTACHMENT FOR WATER-CLOSETS. — James Foley, Brooklyn, N. Y.

306,078. FIRE-ESCAPE. — Karl Hubner, Paterson, N. J.

306,079. DOOR-HANGER. — Elmer N. Hutchins, Lawrence, Mass.

306,084. ELECTRIC ALARM AND CALL-BELL SYSTEM FOR HOTELS, ETC.—Warren T. Kellogg, Cohoes, N. Y.

306,092. WATER-CLOSET. — Owen J. McGann, Chicago, Ill.

306,123. CALIPERS. — C. Wilhelm Wessman, Chicago, Ill.

306,126. SAFETY-ATTACHMENT FOR ELEVATORS. —Otto Charles Berchtold and Emil L. Lauffer, Cleveland, O.

306,134. PORTABLE DERRICK. — Donald Crane, Woodland, Cal.

306,137. BRICK.—Jean Darrigan, Cagnottes, France.

306,149. FIRE-ESCAPE. — Jacob Haege, Garfield, Kans.

306,154. HAND-GRENADE FOR FIRE-EXTINGUISHERS. — Henry D. Harden, Chicago, Ill.

306,156. ELEVATOR. — Charles W. Hayes, Orange, N. J.

306,168-171. COMPOUND FAUCET. — Frederick W. Moseley, Poultney, Vt.

306,178. HOT-AIR GENERATOR FOR FIREPLACES. —Joseph H. Roberts, Toronto, O.

306,189. REAMER. — Thomas H. Thompson, Hartford, Conn.

306,195. BRICK-KILN.—Stephen W. Underhill, Croton Point, N. Y.

306,201-202. ALARM-APPARATUS FOR AUTOMATIC FIRE-EXTINGUISHERS. — Charles C. Worthington, Irvington, N. Y.

306,203. BENCH-STOP. — John Adams, Hancock, N. Y.

306,218. FIRE-GRATE. — Edward Card, Pawtucket, R. I.

306,235. FIRE-ESCAPE. — William A. Fries, Clifton Heights, Pa.

306,237. SCREW-DRIVER. —Willis B. Gilmore, Minneapolis, Minn.

306,286. SASH-FASTENER. — Frank W. Sawtelle, Dedham, and Jas. T. Williams, Hyde Park, Mass.

306,316. AUTOMATIC FIRE-EXTINGUISHER. — Joseph R. Brown, Bridgeport, Conn.

306,329. PAINT-COMPOUND FOR ROOFS, ETC. — Edward Clark, Tiffin, Ohio.

306,334. SASH-FASTENER. —Horace L. Heaton, Indianapolis, Ind.

306,349-351. PNEUMATIC DOOR-CHECK. — Stephen Porter, Boston, Mass.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS.—Since our last report twenty-seven permits have been granted, the more important of which are the following:—

Wm. Collett, 5 three-st'y brick buildings (square), s s Lafayette Ave., w of Fremont St.

J. L. Bowen, 5 two-st'y brick buildings, s s Cross St., w of Washington Ave.

E. J. McMullen, 3 three-st'y brick buildings, n s Lanvale St., commencing n e cor. Stockton Alley.

A. L. Gorter, 6 three-st'y brick buildings, n s Robert St., commencing n e cor. McCulloh St.

St. James Home for Boys, four-st'y brick building, n e cor. High and Low Sts.

Church of the Star of the Sea, two-st'y brick building, 43′ x 82′, n e cor. Battery Ave. and Clement St.

Elias Hahn, 9 three-st'y brick buildings (square), e s Eutaw Pl., commencing s e cor. Pressman St.

Sheep Butchers' and Wool-pulling Association No. 2, 5 two-st'y brick buildings, e s Pennsylvania Ave., between Laurent and Robert Sts.

Geo. C. Hershman, 13 two-st'y brick buildings, s s Biddle St., commencing s e cor. Ensor St.

Hy. Schaumberg, 3 two-st'y brick buildings, commencing s e cor. Sterrett St. and Sterrett Alley.

C. H. Blanch, 5 two-st'y brick buildings, commencing s w cor. Broadway and Hoffman St.

J. H. Gable, 5 three-st'y brick buildings, e s Woodyear Alley, s of Cemetery Lane.

Brooklyn.

BUILDING PERMITS. — *Dean St.*, s s, 100′ w Vanderbilt Ave., three-st'y brick tenement, gravel roof; cost, $4,000; owner, Thos. R. Farrell, 644 Dean St.; architect, I. D. Reynolds.

Vanderbilt Ave., w s, 40′ n Dean St., three-st'y brick store and tenement, felt and gravel roof; cost, $4,000; owner, Wm. C. Marvin, Elliott Pl.; architect, Wm. V. Williamson.

Second Ave., w s, 10′ s Thirty-ninth St., one-st'y brick manufactory, board roof; cost, about $3,000; owner, Phœnix Chemical Co., 87 Maiden Lane, New York; architect, Samuel Bennett; builders, Carlin & Son and John H. O'Rourke.

Sixth St. Basin, n s, 348′ w Second Ave., three-st'y frame manufactory, gravel roof; cost, $9,000; owner, C. O. Wolcott, 55 Pearl St.; architect, M. A. Case; builder, Geo. H. Stone.

Sixth Ave., w s, 24′ s Carroll St., 3 two-st'y brown-stone dwells., tin roofs; cost, each, $6,000; owner and mason, Theodore P. Cooper, New York Hotel; architects and carpenters, Martin & Lee.

Jefferson St., n s, 100′ w Throop Ave., 3 two-st'y brown-stone dwells., tin roofs; cost, each, $5,000; owner and builder, Wm. Reynolds, 400 Jefferson St.; architect, I. D. Reynolds.

Gates Ave., s e cor. Franklin Ave., four-st'y brick flat, gravel roof, wooden cornice; cost, $14,000; owner and builder, Jas. B. Alexander, 108 Pacific Ave., Jersey City; architect, A. Hill.

Nostrand Ave., s e cor. Lafayette Ave., three-st'y brick and terra-cotta store and flat; cost, $9,000; owner, Mrs. M. E. Kohlman, Nostrand Ave., Kosciusko St.; architects, Parfitt Bros.; builders, Fitall & Scrivan and E. Hendrickson.

Meserole St., s s, 175′ e Bushwick Ave., four-st'y brick beer-storage, tin roof; cost, $42,000; owner, Otto Huber, on premises; architect, C. Stoll; builder, —— McQuade.

Jefferson St., s s, 300′ e Central Ave., three-st'y frame (brick-filled) tenement, tin roof; cost, $4,200; owner, Annie M. Armendinger, 83 Melrose St.; architect, Th. Engelhardt; builder, J. Armendinger.

South Oxford St., e s, 392′ 10″ n Atlantic Ave., three-st'y brick and brown-stone dwell., tin roof; cost, $12,000; owner, Wm. Bradley, 248 Sackett St.; architects, Parfitt Bros.

Tenth St., n w cor. Fourth Ave., three-st'y brick store and dwell., tin roof; cost, $6,000; owners, Assip & Buckley, 146 Sixteenth St. and 71 Waverly Ave.; architect, W. M. Coots.

Hewes St., No. 262, three-st'y and basement brown-stone dwell., tin roof; cost, $6,500; owner, John L. Mollenhauer, 250 Hewes St.; architects, Eastman & Davis; masons, W. & T. Lamb, Jr.; carpenter, not selected.

Halsey St., Nos. 142 *and* 144, 2 three-st'y brown-stone dwells., tin roofs; cost, each, $7,000; owner, etc., John S. Frost, 568 Franklin Ave.

Wyckoff St., No. 392, four-st'y brick tenement, gravel roof; cost, $6,500; owner and builder, John D. Anderson, 225 Raymond St.; architect, Geo. W. Anderson.

Tenth St., n s, 20′ 9″ w Fourth Ave., 5 two-st'y brick dwells., tin roofs, wooden cornices; cost, each, $4,000; owners, Assip & Buckley, 146 Sixteenth St. and 71 Waverly Ave.; architect, W. M. Coots.

Bedford Ave., w s, 80′ n Ross St., three-st'y brown-stone dwell., tin roof; cost, $30,000; owner, Joseph F. Knapp, cor. Bedford Ave. and Ross St.; architect, Arthur Crooks; builders, W. & T. Lamb, Jr., and Smith & Bell.

Clifton St., s s, 90′ e Bedford Ave., 4 two-and-one-half-st'y brown-stone dwells., tin roofs; cost, each, $4,000; owner, E. T. Rider, 128 Quincy St.; architect, Amzi Hill; builder, Wm. J. Rider.

Broadway, n e cor. Park St., three-st'y brick store and tenement, tin roof; cost, $9,500; owners and builders, Jno. L. Gans and A. Voltz, 24 Jefferson St.; architect, John Herr.

Sackett St., n s, 40′ e Court St., three-st'y brick store and dwell., tin roof; cost, $3,800; owner, Jas. Calvert, cor. Second Pl. and Court St.; architect and carpenter, Wm. Wilson; mason, Thos. B. Kutan.

Jefferson St., s s, 250′ w Hamburg Ave., three-st'y frame (brick-filled) tenement, tin roof; cost, $4,000; owner, Annie M. Armendinger, 83 Melrose St.; architect, Henry Vollweiler; builder, Jacob Armendinger.

Locust St., n s, 225′ e Broadway, three-st'y frame (brick-filled) store and tenement, tin roof; cost, $4,300; owner and builder, Geo. Loeffler, 78 Jefferson St.; architect, Henry Vollweiler.

Magnolia St., n s, 50′ e Irving Ave., three-st'y frame (brick-filled) tenement, tin roof; cost, $4,000; owner, etc., Jas. Williamson, 676 Gates Ave.

Union St., n s, 212′ e Seventh Ave., 2 three-st'y brown-stone dwells., tin roofs; cost, each, $10,000; owner, etc., John Magilligan, 56 Berkeley Pl.

Bainbridge St., n s, 178′ w Reid Ave., 4 two-st'y brick dwells., tin roofs; cost, each, $3,500; owner, Kate Acor, 177 Bainbridge St.; architect and builder, C. Linken.

Columbia St., w s, 150′ s Hamilton Ave., three-st'y brick store and tenement, tin roof; cost, $5,000; owners, architects and builders, M. Gibbons & Son, 55 Rapelyea St.

Boerum St., No. 159, n s, 150′ e Graham Ave., four-st'y frame (brick-filled) tenement, flat tin roof; cost, $6,000; owner, Barbara Wischerth, 57 Troutman St.; architect, Th. Engelhardt; builder, Jacob Armendinger.

Ralph Ave., w s, 18′ s Bainbridge St., 4 three-st'y frame (brick-filled) tenements, felt and gravel roof; cost, about $2,500 each; owner, Elizabeth Phelan, 362 Hart St.; architect, F. F. Thomas.

Fourth Ave., n w cor. Forty-sixth St., three-st'y frame (brick-filled) tenement, flat tin roof; cost, $20,000; owner and architect, W. A. Fries, 201 Forty-fourth St.

Rapelyea St., n s, 125′ e Hamilton Ave., four-st'y brick tenement, tin roof; cost, $6,000; owner, Mr. Keegan, 59 Rapelyea St.; architect, Mr. Hayler; builders, M. Gibbons & Son.

ALTERATIONS. — *River St.*, w s, between South First and South Second Sts., add one st'y to a one-st'y building, gravel roof; cost, $7,000; owner, architect and carpenter, Brooklyn Sugar Refining Co., First St., cor. South Second St.; mason, S. J. Burrows.

Chicago.

BUILDING PERMITS. — T. Dowling, two-st'y dwell., 3609 Indiana Ave.; cost, $4,500; architect, A. J. Halberg.

D. Blair, 2 one-and-one-half-st'y cottages, 434-438 Idaho St.; cost, $3,600; builders, G. Lehman & Co.

Mrs. A. Portman, two-st'y dwell., 604 West Superior St.; cost, $4,000; architect, C. O. Hanson; builder, N. P. Laberg.

A. Fields, 2 three-st'y dwells., 192 and 193 Butterfield St.; cost, $6,000; architect, F. Doerr.

Mrs. M. Parratt, 2 two-st'y dwells., 227 and 229 Wilmot Ave.; cost, $5,000.

F. Little, 2 one-st'y cottages, 44-50 Whipple St.; cost, $2,500.

Mrs. S. C. Congdon, 2 two-st'y dwells., 3514 and 3516 Forest Ave.; cost, $5,000.

Howting & Crowhurst, 2 one-st'y cottages 609-613 Thirty-second St.; cost, $2,500.

A. Schulze, two-st'y addition to dwell., 566 Centre Ave.; cost, $4,000; builder, A. Loula.

H. Reese, two-st'y store, 881 Blue Island Ave.; cost, $4,000; builder, A. Loula.

A. Cerny, three-st'y dwell., Maxwell St.; cost, $8,600.

F. Hahn, two-st'y dwell., 481 South Wood St.; cost, $4,000.

J. S. Iverson, 2 two-st'y dwells., 3515 and 3517 Wabash Ave.; cost $8,000; architect, S. M. Randolph.

H. Cirbi, two-st'y dwell., 2707 Wentworth Ave.; cost, $3,000.

T. Reath, two-st'y dwell., 503 South Oakley Ave.; cost, $3,000.

J. Ludwig, 2 two-st'y stores and dwells., 3230 and 3232 Laurel St.; cost, $7,000; architect, J. Frank; builder, J. Lauch.

M. Rathgen, two-st'y dwell., 96 Evergreen Ave.; cost, $3,000.

F. Plischka, three-st'y store and dwell., 99 Blue Island Ave.; cost, $7,500.

D. Sullivan, two-st'y dwell., Lincoln Pl.; cost, $3,000.

A. C. Brackebush & Co., two-st'y barn, 30 Congress Park; cost, $2,500; architect and builder, Geo. Hinckley.

W. T. Goss, two-st'y dwell., 504 West Congress St.; cost, $3,000.

J. H. Overs, three-st'y dwell., 77 to 83 Pine St.; cost, $17,000; architects, Thomas & Rodger; builder, C. Moses.

M. Morgan, two-st'y dwell., 144 Lasalle Ave.; cost, $6,000; architect, J. Otto.

J. A. Barbier, 5 three-st'y dwells., 243 to 249 Centre Ave.; cost, $20,000; architect, N. S. Patton.

J. Hallowell, two-st'y dwell., 268 South Robey St.; architect, J. J. Egan; builder, M. J. Benson; cost, $4,000.

R. Hunter, three-st'y store and flats, 3640 and 3642 State St.; cost, $16,000; builders, McMillan Bros.

J. Kirkeby, three-st'y store and dwell., 1020 Milwaukee Ave.; cost, $10,000.

Wm. Hansburg, three-st'y store and dwell., 297 and 299 Clybourn Ave.; cost, $12,000.

Thos. Brown, three-st'y store and dwell., 165 West Chicago Ave.; cost, $7,000; architect, J. J. Matherson; builder, B. Olson.

Mrs. E. J. Hansen, two-st'y dwell., 895 Shuber St.; cost, $3,000.

J. J. Brown, three st'y livery-stable, 140 West Madison St.; cost, $3,000.

Tarrant & Ramsay, one-st'y foundry, 50-56 Indiana St.; cost, $4,200.

V. Topinka, three-st'y store and dwell., 175 West Twelfth St.; cost, $8,000; architect and builder, G. M. Krulover.

F. Cure, two st'y flats, 3427 Dearborn St.; cost, $4,000.

S. Wilken, two-st'y store and dwell., 191 Ambrose St.; cost, $4,200.

T. A. Shaw, two-st'y dwell., 2124 California Ave.; cost, $18,000; architects, Cobb & Frost; builders, Fox & Hinds.

A. Thule, two-st'y dwell., 493 Marshfield Ave.; cost, $4,000; architect, P. W. Ruehl.

J. Brenzel, two-st'y dwell., 12 West Ohio St.; cost, $2,500; architect, J. Otto; builder, A. Fagerlund.

J. J. Bufton, 2 two-st'y dwells., 939 and 941 West Jackson St.; cost, $7,000.

H. Miller, two-st'y dwell., 142 Evergreen St.; cost, $3,000.

J. Beck, three-st'y dwell., 662 North Park Ave.; cost, $5,000; architect, A. F. Boos.

P. Murphy, two-st'y dwells., 612 Loomis St.; cost, $2,700; builder, J. Wittner.

F. Slawik, two-st'y dwell., 512 Ashland Ave.; cost, $3,000; architect, Wilson; builders, Kreig & Demuth.

New York.

HOUSES. — Anthony Mowbray proposes to build on the s s of Eighteenth St., bet. Fifth and Madison Ave., 3 four-st'y brick and brown-stone residences, 25′ x 60′ each, to cost about $100,000; Messrs. McElfatrick Son & De Baun have the plans on hand.

FACTORY. — Messrs. Sypher & Co., will build a brick and granite factory, 75′ x 90′, on the s s of Forty-eighth St., 300′ w of Tenth Ave., to cost $40,000; Messrs. Berger & Baylies are the architects.

BUILDING PERMITS.—*Lafayette Ave.*, w s, 100′ s Gray St., two-st'y frame dwell., slate roof; cost, $3,500; owner, W. E. Andrews, Tremont; builders, W. Holder and Nonamaker & Saunders.

Lincoln Ave., w s, 54′ n Southern Boulevard, four-st'y brick factory, tin roof; cost, $10,000; owner, Annie Derleth, 585 East One Hundred and Thirty-fourth St.; architect, J. W. Cole; builder, John Jordan.

McCombs Dam Road, w s, 600′ n Two Hundred and Sixth St., two-st'y frame dwell., shingle roof; cost, $4,500; owner, Esther Jersey, 279 West One Hundred and Twenty-eight St., architect, Wm. Howe.

Ninety-first St., n s, 70′ e Fourth Ave., 2 three-st'y and brown-stone front dwells., tin roofs; cost, each, $10,000; owner, Susan Sullivan, 1365 Lexington Ave., architect, J. Sullivan.

One Hundred and Thirty-fourth St., s s, 150′ e Lincoln Ave., two-st'y brick factory, gravel roof; cost, $6,000; owner, N. Y. Wood Turning Co., on premises; architect and builder, Wm. J. Merritt.

Avenue B, No. 258, five-st'y brick tenement and store, tin roof; cost, $9,300; owner, Thomas Cunningham, 602 East Fifteenth St.; architect, Fred. Jeuth.

Courtland Ave., No. 561, three-st'y frame tenement, tin roof; cost, $5,500; owner, Hugh Martin, 565 Courtland Ave.; architect, A. Janson; builders, Janson & Jaeger.

West Fifty-second St., Nos. 515, 517, *and* 519, 3 five-st'y brick tenements, tin roofs; cost, each, $16,50 ; owners, Elsworth L. Striker, 308 West Fifty-second

St., and John Quinn, n e cor. Eleventh Ave. and Fifty-first St.; architect, C. F. Ridder, Jr.

First Ave., n w cor. Seventieth St., four-st'y and attic brick school-house, tin and slate roof; cost, $110,000; owner, City of New York; architect, J. N. Stagg.

Sedgwick Ave., w s, 100′ s Morris Dock Station, two-st'y frame dwell., slate roof; cost, $5,000; owner, Archibald Buchanan, 874 Eighth Ave.; architect, Chas. Baxter.

Sixtieth St., n s, 175′ w Tenth Ave., five-st'y brown-stone tenement, tin roof; cost, $13,000; owner, Thos. Cowman, 513 West Sixtieth St.; architect, M. Louis Ungrich.

Eighty-fourth St., s s, 150′ w Second Ave., five-st'y brick tenement, tin roof; cost, $20,500; owner, Geo. Keller, West Farms; architect, John McIntyre; builders, Hollister & Friedlein.

Brook Ave., e s, 25′ s One Hundred and Forty-sixth St., two-st'y frame dwell. and store, tin roof; cost, $3,600; owner, Wenzel Kraus, 623 North Third Ave.; architect, Adolph Pfeiffer.

Morris Ave., w s, 53′ n One Hundred and Forty-eighth St., three-st'y brick dwell., tin roof; cost, $4,000; owner, Carl Hulster, Morris Ave. and One Hundred and Forty-eighth St.; architect, Adolph Pfeiffer.

Alterations. — *West Twenty-seventh St., Nos.* 348 *and* 350, three-st'y brick extension, tin roof; cost, $4,000; owner and builder, John L. Hamilton, 318 West Twenty seventh St.

East Thirteenth St., Nos. 410 *and* 412, two and part one-st'y brick extension, gravel roof; cost, $6,000; owner, Geo. B. Marx, on premises; architect, Ernest W. Greis.

East Fortieth St., No. 106, repair damage by fire; cost, $5,000; owner, Geo. C. Haven, 24 East Thirty-ninth St.; builder, Geo. Mulligan.

Philadelphia.

Building Permits. — *Hope St.*, n of York St., three-st'y dwell., 18′ x 34′; T. Matthews, contractor.

Federal St., w of Broad St., two-st'y stable, 20′ x 40′; W. T. Robinson, owner.

Allegheny Ave., cor. Frankford Road, three-st'y dwell., 20′ x 70′; Thos. Quinn, owner.

Lehman St., bet. Little Wayne and Godfrey Sts., two-st'y dwell., 14′ 6″ x 30′; W. Oxford.

Catharine St., e of Fifteenth St., three-st'y dwell., 18′ x 62′; Jno. O'Donnell.

Germantown Road, cor. Lehigh Ave., 7 three-st'y stores and dwells., six, 14′ x 30′; one, 16′ x 40′; P. Hogan, owner.

Franklin St., n of Cumberland St., 8 two-st'y dwells., six, 14′ x 42′; two, 15′ x 42′; A. D. Kennedy, owner.

Fairmount Ave., w of Thirty-seventh St., three-st'y dwell., 18′ x 46′; Wendell & Smith, contractors.

Broad St., n of Norris St., 2 three-st'y dwell., 18′ x 67′; C. C. Moore, owner.

Fairhill St., n of Susquehanna Ave., ice-house and storehouse, 36′ x 44′; W. Techlenberg, contractor.

Hancock St., n of Dauphin St., 4 two-st'y dwells., one, 18′ x 42′; three, 15′ x 42′; J. Williamson, contractor.

Twenty-first St., s of Columbia Ave., three-st'y dwell., 16′ x 52′; C. Backle, contractor.

Chestnut St., w of Thirty-eighth St., three-st'y dwell., 37′ x 84′; W. C. McPherson & Sons, contractors.

Sixth St., s of McClellan St., 9 two-st'y dwells., two, 17′ 7″ x 45′; four, 16′ x 45′; Wm. Morrow, owner.

Catharine St., No. 1434, three-st'y dwell., 18′ x 65′; Cavanaugh & Brown, contractors.

Ash St., n of Salmon St., 2 three-st'y dwells., 16′ x 30′; S. Heim, contractor.

Germantown Ave., No. 4067, three-st'y dwell., 17′ x 50′; Ernest Zell, owner.

Carpenter St., No. 822, four-st'y dwell., 18′ x 62′; J. B. Baratta, owner.

Limekiln Pike, cor. Mill St., two-st'y store and dwell., 24′ x 70′; M. McGrath, owner.

Sixtieth St., e of Kingressing Ave., 2 two-st'y dwell., 20′ x 42′; R. A. Parker, contractor.

Kensington St., cor. Tioga St., two-st'y dwell., 20′ x 60′; J. B. Yerkes, contractor.

Eighteenth St., cor. Berks St., 9 three-st'y dwells., 17′ x 64′; J. Lewis Kates, owner.

Montgomery Ave., e of Girard Ave., 2 two-st'y dwells., 18′ x 45′; Rollison & Taylor, contractors.

Hillory St., bet. Reed and Wharton Sts., 6 two-st'y dwells., 15′ x 38′; Thos. Marshal, owner.

Buckins St., w of Frankford Road, three-st'y dwell., 18′ x 50′; M. B. Maybury, contractor.

Carlisle St., No. 1316, two-st'y dwell., 18′ x 40′; Wm. Bunch, Jr.

Herman St., cor. Hancock St., 2 three-st'y dwells., 16′ x 42′; Oliver P. Fisher, contractor.

Kensington Ave., n of Harrowgate Lane, 2 two-st'y stores and dwells., 17′ x 45′; E. Schmid.

Fifth St., s of Clearfield St., three-st'y dwell., 16′ x 35′; Pat McCaskey, owner.

Somerset St., bet. Fairhill and Sixth Sts., 2 three-st'y dwells., 17′ x 29′ and 16′ 10′ x 28′; M. Fox, owner.

Baring St., n of Fortieth St., three-st'y dwell., 18′ x 54′; W. P. Fogg, contractor.

Harvey St., Nos. 52 *and* 54, 2 three-st'y dwells., 18′ x 47′; W. H. Brunner, contractor.

Beach St., No. 1613, two-st'y machine-shop, 15′ x 30′; R. A. Bears.

Penn St., n of Harrison St., three-st'y dwell., 33′ x 34′; Daryea & Childs.

St. Louis.

Building Permits.—Fifty permits have been issued since our last report, eleven of which are for unimportant frame houses. The rest of those worth $2,500 and over are as follows: —

Stan. Jobrowicz, 3 adjacent tenements; cost, $7,200; Theo. Roesch, contractor.

M. Cosgrool, two-st'y brick dwell.; cost, $2,800; contract sub-let.

John Spurr, two-st'y brick dwell.; cost, $3,000.

C. Hage & Bros., alteration shop and warehouse; cost, $5,000; Helm & Bro., contractors.

St. Louis Mutual House-Building Co., two-st'y store and dwell.; cost, $2,700; E. Mortimer, architect; J. Kaiser, contractor.

L. Ph. Sichler, two-st'y brick dwell.; cost, $3,000; contract sub-let.

Thomas Menton, two-st'y store and dwell.; cost, $5,300; O'Malley & Bros.

Henry Fenerbach, three-st'y store and flats; cost, $5,500; contract sub-let.

Adam Reitz, 3 adjacent two-st'y tenements; cost, $5,300; O. Koenig, architect; F. Hermann, contractor.

L. Tompkins, 2 adjacent two-st'y stores and dwells.; cost, $6,500; T. Gugarty, contractor.

Bids and Contracts.

List of proposals received and opened at noon, on September 25, 1884, by Gen. M. C. Meigs, Supervising Engineer and Architect, for iron-work for roofs over the new Pension Building, in Washington, D. C.:—

C. A. Schneider Bros., Washington, D. C., for the whole work, $59,393.

Fort Pitt Steam Boiler and Building Works, Pittsburgh, Penn., $49,489.

Riverside Bridge and Iron Works, Paterson, N. J., $44,444.

Phœnix Iron Company, Trenton, N. J., $48,875.

Cheney & Hewlett, New York, N. Y., $65,000.

Penn Bridge Works, Beaver Falls, Pa., $44,375.

Post & McCord, New York, N. Y., $59,844.

New Jersey Steel and Iron Company, Trenton, N. J., for roofs over office room, 3½ cents per pound; for roofs over court-yard, 5 4-10 cents per pound.

Snead & Co. Iron Works, Louisville, Ky., for the whole work, $54,987.

Pittsburgh Bridge Co., Pittsburgh, Pa., $39,492.

Passaic Rolling Mill Co., Paterson, N. J., $43,833.

Keystone Bridge Co., Pittsburgh, Pa., $58,548.

W. C. Carroll & Co., Pittsburgh, Pa., $51,000.

King Iron Bridge Co., Cleveland, O., $47,000.

Haugh, Ketcham & Co., Indianapolis, Ind., $47,838.

Other bids were received, after the time for opening, from Schiffler Bridge Works, of Pittsburgh, Pa., for $47,450.

Union Foundry & Pullman Car-Wheel Works, of Chicago, Ill., for $58,227.

Baltimore, Md.—The following is an abstract of the bids on carving the stone panels and spandrels for the court-house and post-office: —

M. A. McGowan, 6 panels and imposts, for first story, $13,770; panels, A, $1,350; B, $1,260; C, $1,380; D, $1,400; E, $1,340; F, $1,500; G, $1,600; H, $1,500; 52 spandrels, I, $17,720.

John Monroe, 6 panels and imposts, first story; $11,297; panels, A, $880; B, $880; C, $1,320; D, $792, E, $792; F, $792; G, $1,320; H, $792; 52 spandrels, I, $9,659.

Cape Ann Granite Company; panels, A, $1,015.63; B, $1,015.62; C, $1,145.63; D, $982.29; E, $1,073.90; F, $1,098.96; G, $1,132.29; H, $992.29; 52 spandrels, I, $11,208.33.

Alex. Kemp, panels and imposts, first story, $6,000; panels, A, $890; B, $890; C, $950; D, $890; E, $890; F, $890; G, $950; H, $890; 52 spandrels, $8,320.

Rock Island, Ill. — The following is an abstract of the bids for supplying wrought-iron beams to the Ordnance Depot: —

A. and P. Roberts & Co., Philadelphia, Penn., $15,528.75 (*accepted*).

New Jersey Steel and Iron Company, Trenton, N. J., $16,091.02.

Phœnix Iron Company, Philadelphia, Penn., $15,536.36.

Passaic Rolling Mill Company, Patterson, N. J., $15,544.84.

Carregre Bros. & Co., Pittsburg, Penn., $14,559.11.

Pottsville Iron and Steel Company, Pottsville, Penn., $15,537.66.

Jones & Laughlin, Chicago, Ill., $14,403.88. This firm failed to bid on several articles.

PROPOSALS.

RIP-RAP GRANITE.
[At Block Island, R. I.]
Engineer Office, U. S. Army,
Newport, R. I., October 6, 1884.

Sealed proposals, in duplicate, will be received at this office **until 12 o'clock, noon, on Tuesday, the 28th day of October, 1884,** at which time they will be opened in presence of bidders, for furnishing rip-rap granite for the breakwater at Block Island, R. I., under the appropriation by the Act of Congress of July 5, 1884, of $15,000.

The United States reserves the right to reject any or all proposals.

Specifications, blank proposals, and full information as to the manner of bidding, conditions to be observed by bidders, and terms of contract and payment, will be furnished on application to this office.

GEORGE H. ELLIOT,
461 Lt.-Col. of Engineers.

ARMY BARRACKS.
[At Newport, R. I., and New York, N. Y.]
Office of Chief Quartermaster,
Department of the East,
Governor's Island, N. Y. H., October 15, 1884.

Sealed proposals in triplicate, subject to the usual conditions, will be received at this office, and the Offices of the Quartermaster at the posts mentioned below, **until 12 o'clock, M., Eastern time, on the 15th day of November, 1884,** at which time and places they will be opened in the presence of the bidders, for the construction of one set of barracks of brick, or frame, at each of the posts of Fort Adams, R. I., and Fort Hamilton, N. Y. H., in accordance with plans and specifications, which can be seen at this office, and at the Offices of the Post Quartermaster at Fort Adams, R. I., and Fort Hamilton, N. Y. H.

One copy of this advertisement should be securely attached to each triplicate proposal, and be mentioned therein as comprising part of it.

Blanks for proposals and information as to manner of bidding, etc., can be obtained at this office.

Proposals must be accompanied by a guarantee with two sureties in the sum of two hundred dollars.

A proposal not accompanied by such a guarantee will not be considered.

PROPOSALS.

Envelopes containing proposals should be marked "Proposals for Construction of Barracks."

The Government reserves the right to reject any or all bids.

ALEX. J. PERRY,
462 Assistant Quartermaster General, U. S. Army.

BRIDGE.
[At Cincinnati, O.]
Cincinnati, September 29, 1884.

Sealed proposals will be received at the office of the County Commissioners, southwest corner Fourth and Race Sts., **until Wednesday, October 22, 1884, at 12 o'clock,** M., for the iron superstructure and masonry of a bridge over Duck Creek, on the road from Red Bank to Madisonville, in Columbia Township, to consist of one span, of eighty feet, with clear roadway twenty feet.

To be built according to plans and specification now on file in the County Commissioners' office.

The Commissioners reserve the right to reject any or all bids.

By order of the Board of County Commissioners.
JOSEPH W. BREWSTER,
460 County Auditor.

STONE AND BRICKWORK.
[At Terre Haute, Ind.]
Office of Supervising Architect,
Treasury Department,
Washington, D. C., October 6, 1884.

Sealed proposals will be received at this office **until 2 P. M., on the 31st day of October, 1884,** for supplying and setting all the stone-work, and furnishing and laying all the brickwork required for the basement and superstructure of the post-office, etc., building at Terre Haute, Ind., in accordance with drawings and specification, copies of which may be seen and any additional information obtained on application at this office, or the office of the superintendent.

Bids must be accompanied by a certified check, and those received after the time of opening will not be considered.

M. E. BELL,
460 Supervising Architect.

CROTON AQUEDUCT.
[Near New York, N. Y.]
Aqueduct Commission,
Room 78, Tribune Building,
New York, October 3, 1884.

Bids or proposals for constructing Sections A and B of the New Croton Aqueduct in the 24th Ward of the City of New York, will be received at this office **until Wednesday, October 29, 1884, at three o'clock,** P. M., at which place and hour they will be publicly opened and read by the Aqueduct Commissioners; and the award of the contract will be made by said Commissioners as soon thereafter as practicable.

The portion of the new aqueduct for which bids are hereby invited is in tunnels, and is divided into two sections, viz.: —

Section A, extending from a point near the High Bridge, northward a distance of about 11,850 feet; and having three working shafts.

Section B, extending from the end of Section A northward a distance of about 12,300 feet, and having two working shafts.

Bidders can bid for either one, or for both, of the above sections; but each section must be bid for, and will be awarded separately. Any bidder for both Sections who will not accept an award for one Section only, must so state in his bid.

Each bid must be inclosed in a sealed envelope, indorsed with the name of the person or persons making the same, and the Section for which it is made.

Each bid must state the name and place of residence of the person making the same, and the names of all persons interested with him therein; also that it is made without any connection with any other person making a bid for the same work, and is in all respects fair and without collusion or fraud; that no member of the Aqueduct Commission, or of the Common Council, no head of a Department, Chief of a Bureau, deputy thereof, or clerk therein, or other officer of the Corporation, or any person in the employ of the Aqueduct Commissioners, is directly or indirectly interested in the bid, or in the work to which it relates, or in the profits thereof.

Each bid must be verified by the oath of the party making the same, that the several matters therein stated are true, and must be accompanied by a certified check upon a National or State Bank, of the City of New York, drawn to the order of the Comptroller of the City of New York, for an amount not less than five per cent of the amount of the security required for the faithful performance of the contract. Such check must not be inclosed with the bid or proposal, but must be delivered to the Aqueduct Commissioners, or to their Secretary, for delivery to the Comptroller. All deposits, except that of the successful bidder, will be returned by the Comptroller to the persons making the same within three days after the contract is awarded. If the successful bidder shall neglect or refuse to execute the contract within ten days after notice that it has been awarded to him, the amount of the deposit made by him shall be forfeited to and retained by the City of New York as liquidated damages for such neglect or refusal, pursuant to the provisions of Section 29 of Chapter 490 of the Laws of 1883; but if he shall execute the contract within the time aforesaid, the amount of his deposit will be returned to him.

The amount of security required in the contract for Section A is one hundred and twenty five thousand dollars; and for Section B, one hundred and thirty-five thousand dollars; with not less than two satisfactory sureties, who must be householders, or resident freeholders, of the State of New York.

The Aqueduct Commissioners reserve the right to reject any and all bids if they deem it for the best interest of the city so to do.

Blank forms of bid or proposal, and proper envelopes for their inclosure; forms of the contract, specifications, and bond, and all other information required, can be obtained at the office of the Aqueduct Commissioners, Room 78, Tribune Building, New York.

By order of the Aqueduct Commissioners.
460 JAMES W. McCULLOH, Secretary.

Publishers' Department.

The American Architect and Building News.

PUBLISHED EVERY SATURDAY BY

JAMES R. OSGOOD & COMPANY,

211 TREMONT STREET, BOSTON, MASS.

BRANCH OFFICE, 658 BROADWAY, NEW YORK.

15 cents per copy; $6.00 per year; six months, $3.50; 12 Monthly Numbers, $1.75.

☞ Payment should be made *directly* to the publishers, either by draft or post-office order.

New Advertisements.

FRIEDERICHS & STAFFIN (Detroit, Mich.), Stained Glass. Page iii.
FLYNT BUILDING AND CONSTRUCTION CO. (Palmer, Mass.), Contracting. Page x.

WANTED.

ARCHITECTURAL PARTNERSHIP.—A gentleman, age thirty-two, of varied experience, a first-class designer and manager, desires to find an opening with a New York or Brooklyn firm of standing and prospects, with a view to a good partnership. Please address, "Architect," 930½ Lafayette Ave., Brooklyn, N. Y. 461

WANTED.

SITUATION.—Wanted, situation, by a competent draughtsman of over fifteen years' experience. Construction and perspective have received special attention. Address, "E.," care *American Architect*. 461

PROPOSALS.

STEAM BOILER. [At Wilmington, N. C.]

U. S. ENGINEER OFFICE, 378 ST. PAUL STREET, BALTIMORE, MD., October 1, 1884.

Proposals for furnishing a steam boiler for the improvement of the Cape Fear River, N. C., will be received **until noon of October 24, 1884,** and opened immediately thereafter.

Blank forms, specifications and information can be had upon application to this office or to the resident engineer, Mr. Henry Bacon, at Wilmington, N. C.

WM. P. CRAIGHILL,
460 Lieut.-Col. of Engineers, U. S. A.

JOINER'S WORK AND WOOD FLOORING. [At Memphis, Tenn.]

OFFICE OF SUPERVISING ARCHITECT, TREASURY DEPARTMENT, WASHINGTON, D. C., October 4, 1884.

Sealed proposals will be received at this office **until 2 o'clock, P.M., on the 20th day of October, 1884,** for furnishing and fixing in place complete, all the joiner's work and wood flooring required for the custom-house and post-office building at Memphis, Tenn., in accordance with drawings and specification, copies of which may be seen, and any additional information obtained on application at this office, or the office of the superintendent.

Bids must be accompanied by a certified check, and those received after the time of opening will not be considered.

M. E. BELL,
460 Supervising Architect.

SUPPLIES AND MATERIAL. [At Memphis, Tenn.]

U. S. ENGINEER OFFICE, MEMPHIS, TENN., September 25, 1884.

Sealed proposals, in duplicate, will be received **till 12 o'clock, noon, of October 25, 1884,** at this office, for furnishing any or all material required for the Second and Third Districts, Mississippi River, for the fiscal year ending June 30, 1885, consisting of rope, iron, wire, nails, spikes, hardware, castings, oils, paints, lumber.

The probable quantities required will be found in the form furnished. Preference will be given to articles of domestic production.

Bidders are requested to be present at opening of bids. Blank forms for proposals, instructions to bidders and specifications may be obtained by addressing this office. Proposals must be made on forms furnished. The United States reserves the right to reject any or all proposals.

Proposals must be addressed to the undersigned and marked on envelope "Proposals for Supplies and Material, Second and Third Districts, Mississippi River."

460 CLINTON B. SEARS.
Capt. Engineers, U. S. A.

HEADSTONES. [At Washington, D. C.]

OFFICE OF NATIONAL CEMETERY, WASHINGTON, D. C., September 27, 1884.

Sealed proposals, in triplicate, with a copy of this advertisement attached to each, will be received at this office **until 12 M., Thursday, November 6, 1884,** for furnishing 4,000 headstones, more or less, of American white marble, for unmarked graves of Union soldiers, under the provisions of the Acts of Congress of March 3, 1873, and February 3, 1879.

Specifications for the work, blank forms of proposals, and all necessary information on the subject will be furnished on application to this office.

Proposals are required to be submitted on the forms supplied for the purpose.

The right is reserved to reject any or all bids.

Bids should be indorsed, "Proposals for Furnishing Headstones," and addressed to the undersigned.

R. N. BATCHELDER,
461 Deputy Quartermaster Gen., U. S. A.

PROPOSALS.

IMPROVING APPOMATTOX RIVER, VA. [At Norfolk, Va.]

U. S. ENGINEER OFFICE, NORFOLK, VA., September 23, 1884.

Sealed proposals, in triplicate, will be received at this office **until noon of October 23, 1884,** and opened immediately thereafter, in the presence of bidders, for dredging one hundred and thirty-five thousand (135,000) cubic yards more or less, and for furnishing small quantities of piles, lumber, gravel, brush, binding poles, bolts, and spikes for the improvement of Appomattox River, Virginia.

Specifications, instructions to bidders, and blanks for proposals can be had on application to this office.

460 F. A. HINMAN, Capt. of Engineers, U.S.A.

WORKINGMEN'S HOUSES. [At Panama, C. A.]

On the 21st of October, 1884, at the office of the Panama Canal Company, in Panama, proposals will be received for the construction of five hundred workingmen's houses. These houses are 33′ x 40′, and are to be built of pitch-pine or Oregon pine, and to contain thirty berths. They are to be distributed in equal proportion in three sections, between Gatun and Gorgona and Culebrara, and Culebrara and Panama, the exact locations to be designated later by the company.

The proposals are not to exceed $1,800, Columbian money, for each house.

For the plans and specifications, address, at Panama, the Director-General of the works; at New York, the Agent of the Company, 18 Broadway. 460

Continued on page xii.

WANTED.

CANVASSERS.—One or more canvassers who can furnish satisfactory references. Address the *American Architect*, 211 Tremont St., Boston.

WANTED.

DRAUGHTSMAN.—A thoroughly competent architectural draughtsman, best of references required. Address, stating terms "S.," care of the *American Architect and Building News*. 460

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— AND —
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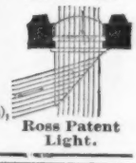

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The finest and most extensive structures in this country are painted with these paints, among them, the U. S. Capitol at Washington; Light Houses and Life Saving Stations; U. S. Custom House at Chicago; Navy Yard Buildings; Metropolitan Elevated R. R.; Oriental and Manhattan Beach Hotels; Oriental and Manhattan Beach Hotels; the "Argyle" and Cottages at Babylon; Hygeia Hotel, Fortress Monroe; Thousand Islands House; Crossman House; Forest Hill House, Franconia, N. H.; Sinclair House, Bethlehem, N. H.; Fort Point House, Stockton, Me.; Pequot House and Cottages, New London, Conn.; Appledore House, Isle of Shoals; the "Dakota," New York City, and thousands of other public and private buildings. Our pamphlet on

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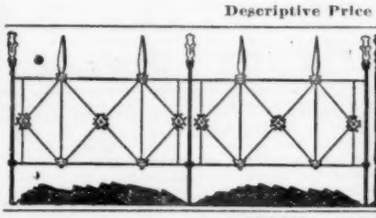

ONE OF OUR RAILINGS are worth two of any other kind, but we will sell this pattern of **Composite Wrought Iron Railing,** at the rate of $1.50 per lineal foot 3 ft. high. The Chilled Iron Ornaments are poured on to the Wrought Iron Rods welding the panel into one piece without joints or crevices for rust to enter. It is made to set on stone or to go into ground.

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Architects and visitors interested in building, from all parts of the country, are particularly invited to make this establishment their headquarters. Information and assistance will be extended to them, and use of writing and reading rooms gratis.

Visitors' Correspondence may be addressed in care of this establishment.

HENRY LORD GAY, Proprietor. T. S. HOTCHKISS, Manager.

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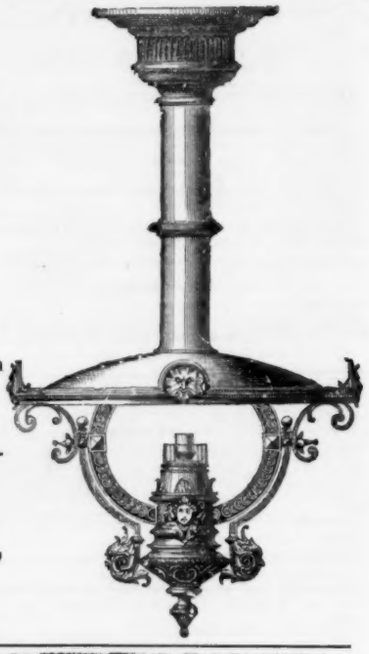

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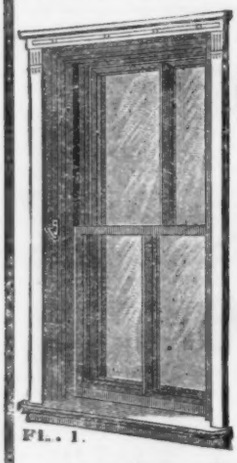

Fig. 1.—Interior view of window, with ATTWELL LOCK applied, the key-head and escutcheon being alone visible.

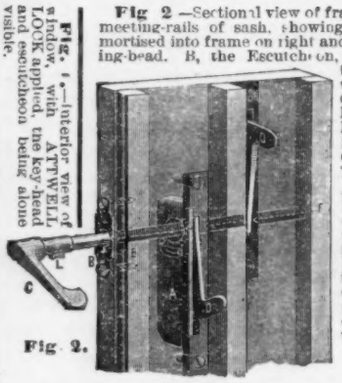

Fig. 2.—Sectional view of frame at left of meeting-rails of sash, showing Locks A A mortised into frame on right and left of parting-bead. B, the Escutcheon, located over keyhole in reveal of frame. C, the REMOVABLE Key, controlling from the ONE POINT THE TWO LOCKS A A D D, the Bolts of Locks, one controlling each sash, operated separately, but working in combination. L, a lug on key, used in operating "shut off"—*i. e.*, holding, at pleasure, either bolt out of engagement with "strike."

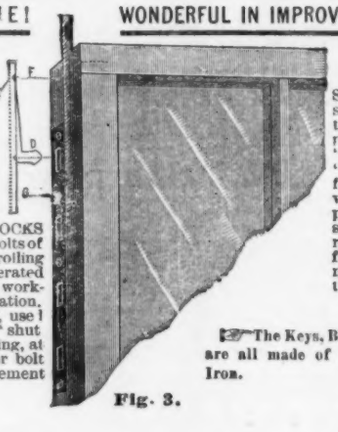

Fig. 3.—Section of sash showing location and application of "strike." This "strike" gives four locking or ventilating points to each sash within a radius of safety from the admission of the thief's body.

☞ **The Keys, Bolts and Strikes are all made of best Malleable Iron.**

As may be seen, these Locks are so located and constructed that *the thief cannot control or force them*, and are especially *convenient to the user*. You can *ventilate*, and, by *removing key*, lock with *safety* at same time. The sashes are *automatically locked*, dispensing with all *care and labor* of closing, and avoiding the possibility of an *omission to lock*. An **ideal sash lock** *to every window, and, where weights are not used*, lends all needed power for *holding and controlling either sash, or both, for purposes of ventilation!* They are *simple in construction, easily applied, adapted to all windows, thoroughly practical in mechanical detail, and are truly possessed of every attribute and novel power claimed for them.*

The Lock are finished in Tucker, Nickel and Bronze; *retail at* 25, 37½ *and* 50 *cents per window;* come neatly packed (hardware complete for one window, with screws, in single box), and *advertising matter*, together with a *perfect working model* (same as Fig. 1), *is supplied gratuitously to the dealer.* Sample Locks, nickel finish, in section (same as Fig. 2), showing application and operation, shipped to any address on receipt of 50 cents. Circulars, Price List and Discounts forwarded on application. Respectfully, &c.,

THE ATTWELL MFG. CO.,

Principal Office: 357 Race St, Cincinnati, Ohio, U. S. A.

PROPOSALS.

COURT-HOUSE.

[At Muncie, Ind.]

AUDITOR'S OFFICE, DELAWARE COUNTY, }
MUNCIE, IND., September 29, 1884. }

New sealed proposals will be received at the auditor's office in the City of Muncie, Delaware County, Ind., **until 2 o'clock, P. M., on Thursday, November 6th, 1884,** for furnishing all materials and labor required in the erection and completion of a new court-house in the City of Muncie, for the County of Delaware, State of Indiana, according to plans and specifications for the same as furnished by B. S. Tolan (successor to T. J. Tolan & Son), architect, Ft. Wayne, Ind.

Plans and specifications can be seen at the auditor's office, and the office of the architect, on and after this date.

Said building will be required to be fully finished and completed on or before the first day of July, 1887.

All proposals must be accompanied by a good and satisfactory bond payable to the State of Indiana, in the penal sum of one hundred and fifty thousand dollars ($150,000). Said bond must be certified by the Clerk of the Court of the County in which the sureties reside, that the same is good and sufficient beyond a doubt.

Blank forms for bids, schedules, and bonds, will be furnished by the auditor upon application, and all bids must be made thereon, or the bid will be rejected. Estimates will be made monthly, and ninety per cent of said estimates will be paid according to contract.

The Commissioners reserve the right to reject any or all bids.

Bidders are required to demand printed instructions in regard to changes as directed by the Board of Commissioners, which instructions are to accompany said new sealed proposals, and must become a part of the contract.

By order of the Board of Commissioners.

WILLIAM DRAGOO,
460 Auditor Delaware County.

COURT-HOUSE.

[At Galesburg, Ill.]

OFFICE OF THE COUNTY CLERK, }
GALESBURG, ILL., October 3, 1884. }

Sealed proposals will be received at this office **till 11 o'clock,** A. M., **on the 24th day of October, 1884,** for supplying all materials and workmanship, and completing every class of work required in the construction of a new court-house at Galesburg, Ill., to be erected according to the plans, specifications and detail drawings of E. E. Myers, architect, which can be seen upon application at this office.

Bids will be made separately for each class of work, or for the work as a whole, and must be indorsed "Proposals for Building the New Court-House," and be addressed to W. Selden Gale, the Chairman of Building Committee, at Galesburg, Ill., stating the time within which the work bid for shall commence and be finished.

All proposals must be addressed to the undersigned, and no proposal will be considered unless accompanied with a full and complete itemized schedule, and made on the blanks furnished by the county.

The Court-House Committee reserves the right to reject any or all proposals, and to let the work as a whole or separately, as they may deem it best.

W. SELDEN GALE,
460 Chairman of Building Committee.

Boynton Furnace Co. 94 Beekman St., N. Y.

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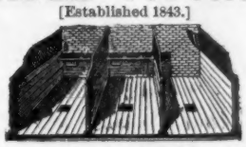

HAY RACKS, MANGERS, ETC., ETC.

☞ Send for Prices and Catalogues.

SAMUEL S. BENT & SON,

72 Beekman St., New York.

Architects, Builders, and others will confer a favor on the Publishers by mentioning "The American Architect and Building News" when sending for circulars or corresponding with parties advertising in these columns.

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[Advertisers can be indexed only under a single head free of charge.]

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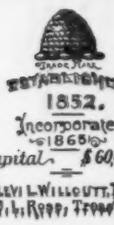

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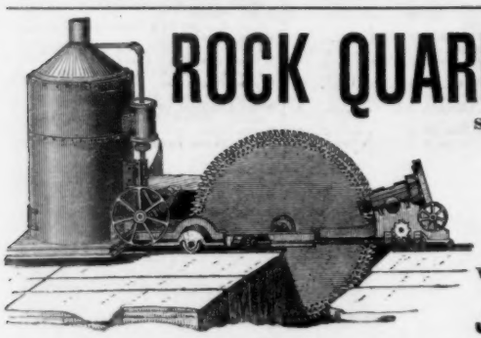

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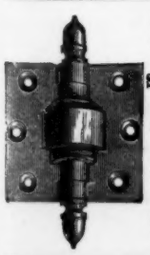

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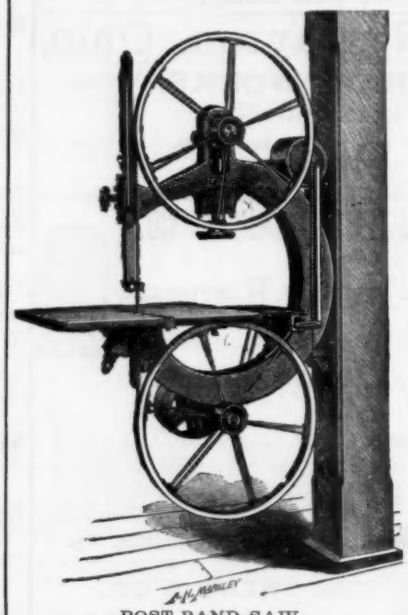
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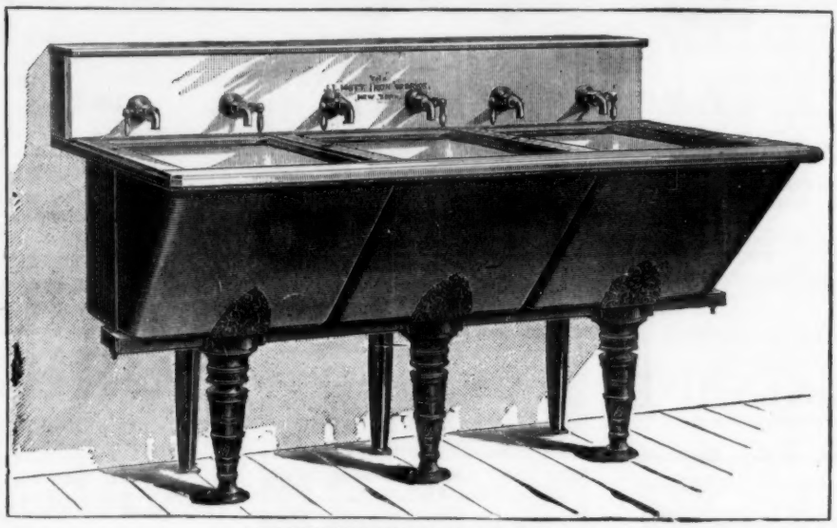

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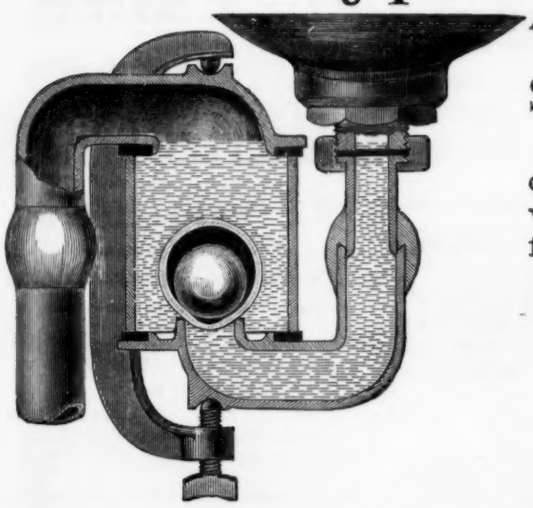

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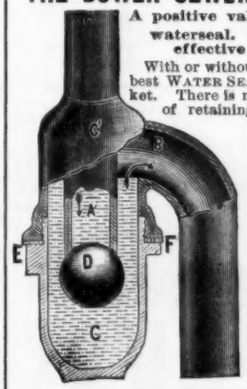

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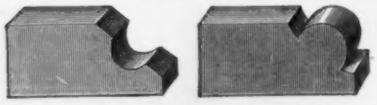

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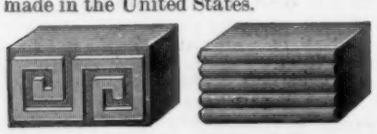

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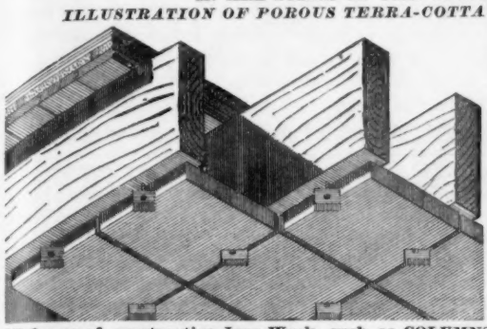

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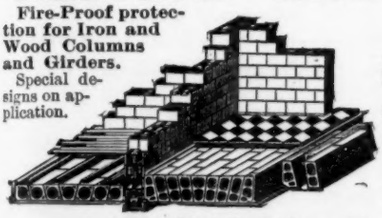

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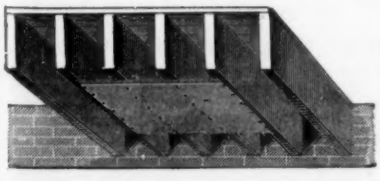

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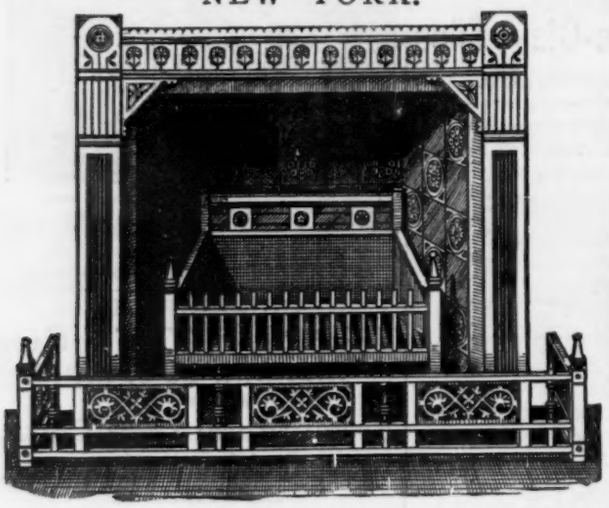

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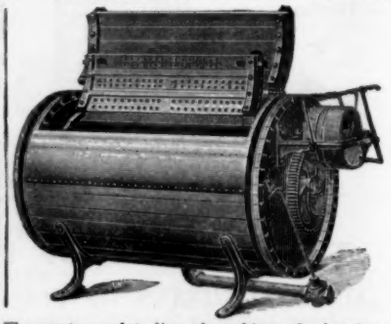

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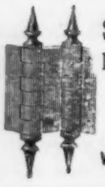

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